**ACN 59181** 

# THE DISMOUNTED INFANTRY AGGREGATION METHODOLOGY (DIAM) IN THE JIFFY GAME

Technical Report TR 1-82

# UNITED STATES ARMY COMBINED ARMS CENTER

COMBINED ARMS

COMBAT DEVELOPMENT ACTIVITY

COMBINED ARMS STUDIES AND ANALYSIS ACTIVITY

Copy available to DTR does not permit fully legible reproduction

APPROYED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

82-369

82 0.7 0.6 0.61 A

# **DISCLAIMER NOTICE**

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

SECURITY CLASSIFICATION OF THIS PAGE (When Date Entered)

REPORT DOCUMENTATION	PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER		3. RECIPIENT'S.CA', ALOG NUMBER	
TR1-82	AD-A116498		
4. TITLE (and Subtitle)		5. TYPE OF REPORT & PERIOD COVERED	
THE DISMOUNTED INFANTRY AGGREGATI (DIAM) IN THE JIFFY GAME	ON METHODOLOGY	Final weeks	
•		6. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR(a)		8. CONTRACT OR GRANT NUMBER(*)	
H. Kent Pickett, Stephan A. Arrin Elizabeth W. Etheridge, Leon D. G	gton, odfrey	·	
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
US Army Combined Arms Combat Deve Combined Arms Studies and Analysi ATTN: ATZL-CAS-OA Fort Leaven	s Activity		
11. CONTROLLING OFFICE NAME AND ADDRESS	NOT CITE NO COOC!	12. REPORT DATE April 1982	
		13. NUMBER OF PAGES	
14. MONITORING AGENCY NAME & ADDRESS(It dittoren	t from Controlling Office)	15. SECURITY CLASS. (of this report)	
•		Unclassified	
,		15. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report)			
Approved for public release: distribution unlimited			
17. DISTRIBUTION STATEMENT (of the abatract entered	In Block 20, If different from	m Report)	
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary an			
Dismounted Infantry Combined		(	
Infantry Aggregati Division War Game Corps War Game	on Methodology		
20. ABSTRACT (Continue on reverse side if necessary an	i identify by block number)		
Results from low resolution of	orps and divisio	n level war games and	

Results from low resolution corps and division level war games and simulations have become increasingly important to decisions involving weapon system procurement and the force structuring process. In the past, dismounted units have been poorly represented in these models. Games such as Jiffy and the developmental CORDIVEM did not portray explicitly the attributes of dismounted squads and platoons. These games were usually oriented to the armor/antiarmor battle, with end of simulation occurring at-

about 500 meters. Consequently, the effects of dismounted units in the corps/division level combined arms battle were not accounted for satisfactorily. This report describes a method for representing such battles in division or corps level simulations by aggregating terrain effects and numbers of weapon systems in order to reduce set up and run requirements while explicitly representing dismounted tactics, weapon lethality, and target vulnerability. The method has general applicability in existing war games. It has been implemented as a computerized combat model in the Jiffy war game and used in gaming support for the High Technology Light Division study.

Studies and Analysis Directorate Combined Arms Studies and Analysis Activity US Army Combined Arms Combat Developments Activity Fort Leavenworth, Kansas 66027

> THE DISMOUNTED INFANTRY AGGREGATION METHODOLOGY (DIAM) IN THE JIFFY GAME

> > by '

H. Kent Pickett Stephan A. Arrington Elizabeth W. Etheridge Leon D. Godfrey

ACN 59181

COI

Accession For NTIS GRAST r to TAB Un ... and

Approved by:

RONALD G. MAGEE

Director, S&AD

ARVID E. WEST, JR. Colonel, Infantry Director, CASAA

# **ACKNOWLEDGEMENT**

The authors gratefully acknowledge the assistance of MAJ(P) Richard St. John, CPT(P) Timothy Reischl, Ms Jody Shirley, and Ms Annette Ratzenberger. Without their help in the design and debug phases of DIAM development, this effort would never have reached completion.

#### ABS TRACT

Results from low resolution corps and division level war games and simulations have become increasingly important to decisions involving weapon system procurement and the force structuring process. In the past, dismounted units have been poorly represented in these models. Games such as Jiffy and the developmental CORDIVEM did not portray explicitly the attributes of dismounted squads and platoons. These games were usually oriented to the armor/antiamor battle, with end of simulation occurring at about 500 meters. Consequently, the effects of dismounted units in the corps/division level combined arms battle were not accounted for satisfactorily. This report describes a method for representing such battles in division or corps level simulations by aggregating terrain effects and numbers of weapon systems in order to reduce set up and run requirements while explicitly representing dismounted tactics, weapon lethal ity, and target vulnerability. The method has general applicability in existing war games. It has been implemented as a computerized combat model in the Jiffy war game and used in gaming support for the High Technology Light Division study.

# TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
ABSTRACT	iii
LIST OF TABLES	v
LIST OF FIGURES	v
CHAPTER 1	
Background and Purpose	1-1
The DIAM Data/Information Flow Structure	1-2
Algorithms Used in DIAM	1-6
References	1-13
CHAPTER 2	
DIAM Internal Data Base	2~1
File Structure for [errain Effects	2-3
File Structure for Weapon Vulnerability	2-10
File Structure for Weapon Movement Rates	2-11
File Structure for Target Acquisition Rates	2-12
File Structure for Weapons Characteristics	2-14
CHAPTER 3	
Introduction	3-1
DIAM functional Areas	3-1
Subroutine Summary	3-4
	3-4
	3-15

# LIST OF TABLES Page 3-1. DIAM Subroutine Summary 3-5 LIST OF FIGURES Page 1-3 1-1. DIAM data and information flow. 1-2. DIAM Logic Flow for Both Attackers and Defenders. 1-7 2-1. DIAM internal data bases. 2-2 2-2. Battle site. 2-4 2-3. Line-of-sight fan for a TOW position. 2-5 2-4. Line-of-sight fan for a small arms position. 2-6 3-1. Flow chart of DIAM module. 3-2

#### CHAPTER 1

#### MODEL METHODOLOGY

#### 1-1. BACKGROUND AND PURPOSE.

- a. The role of the Combined Arms Studies and Analysis Activity (CASAA) in the hierarchy of Army analysis requires the study of corps and division level problems. Analyses at this level, including results from corps and division level war game simulations, have become increasingly important to decisions involving weapon system procurements, force structuring, and scenario generation for the TRADOC community.
- b. The armor-antiarmor battle is generally well represented in most corps/division models, as are other combined arms aspects such as indirect fire, tactical air, close air support, air defense, and minefields. However, the contributions of small infantry units--especially those involving dismounted operations--have not been adequately represented. Most corps/division level simulations represent closure of the forces to ranges of 1000 to 500 meters. At this point the simulated battles are terminated without regard to the closure, assault, and withdrawal phases.
- c. Analysis conducted with these models often fails to give decisionmakers a basis for evaluating the effectiveness of dismounted infantry. Consequently, in February 1980 CASAA was tasked by Commander, Combined Arms Center (CAC) to develop methods for simulating the effectiveness of dismounted infantry in a combined arms corps/division environment. A two-phased effort was initiated to address this problem.
- (1) The first phase consisted of the basic research necessary for any combat model development. During this phase the critical battle activities impacting on division effectiveness were defined through the use of mission profiles supplied by the US Army Infantry Center (USAIC) and through informal discussions with USAIC personnel. A review of the ability of currently running combat models to represent these activities was also conducted. The first phase of the study was completed by developing a methodology for representing these activities in a low resolution division model. The methodology included identification of the basic infantry units that must be modeled, algorithms describing the effectiveness of these units in various activities, and data sources to support these algorithms. A complete report on this phase of the study effort is contained in CASAA TR 6-81, Dismounted Infantry Aggregation Methodology Study (DIAMS), August 1981.
- (2) The second phase of the effort was implementation of the methodology; i.e., building the model (the Dismounted Infantry Aggregation Model--DIAM), constructing the data bases, validating the model, and exercising it in support of several CAC studies. Model construction was completed in September 1981, and interface with the corps/division level Jiffy War Game took place in October 1981. Although DIAM is currently in use as a

submodule of Jiffy, it can also be used alone to analyze the effectiveness of a combined arms force as it closes on dismounted infantry positions from ranges of 1000 meters.

- d. The purpose of this report is to provide a documented reference for DIAM. The report is designed to serve two types of readers.
- (1) Chapter 1 describes the overall methodology used in developing the computer code. It contains a general discussion of the algorithms used to represent the dismounted battle and is provided for the use of those readers interested in "What's going on inside the model."
- (2) Chapters 2 and 3 were developed for those readers who are interested in executing the model. Chapter 2 describes the model data base. Chapter 3 contains a listing of the model code. DIAM is written in FORTRAN 77 using a modular design dictated by standard software engineering practices. The code listed in chapter 3 represents the current Jiffy application of DIAM in subroutine form. The code could easily be modified for use in stand-alone form.
- 1-2. THE DIAM DATA/INFORMATION FLOW STRUCTURE. DIAM is a time stepped, expected value simulation. During each minute of battle, the movement of both forces, their ammunition expenditures, and losses to both forces are calculated. The model requires an extensive data base to represent the lethality, vulnerability, and mobility of a dismounted force in a combined arms battle. Figure 1-1 shows the various types of data bases required by the DIAM attrition model. The figure shows that the model requires data inputs from two sources, a host and its own internal data base.
- a. Data Input From Host. Host inputs are used by DIAM to establish a battle scenario. In essence they describe who is fighting, what type of battle the user wishes to model, and where (type of terrain) the fight will occur. They represent a simplified version of the type of scenario data required for a high resolution model. The host may be either a larger model using DIAM as a submodule, such as Jiffy, or an analyst/gamer using DIAM in the stand-alone version. The following data are required from the host:
- (1) Weapon lists. Complete lists of all weapons to be represented in the DIAM battle must be provided by the host. DIAM currently has a library of 25 different weapon types (e.g., Viper, Dragon, IMAWS, M-1, IFV) for Blue and 25 types for Red. The user is allowed to select a maximum of 10 Blue types and 10 Red types for each battle. The number of weapons of each type (e.g., 75 Viper, 5 Dragon, 10 M-1) must also be provided by the user. The model automatically positions these weapons on the terrain in response to the user's selection of battle scenario (see para b(2), Terrain effects, below).
- (2) Artillery firing rates. Artillery firing rates and loss rates to each weapon type are also required from the host. The version of DIAM described in this report uses the Jiffy artillery module to assure consistency

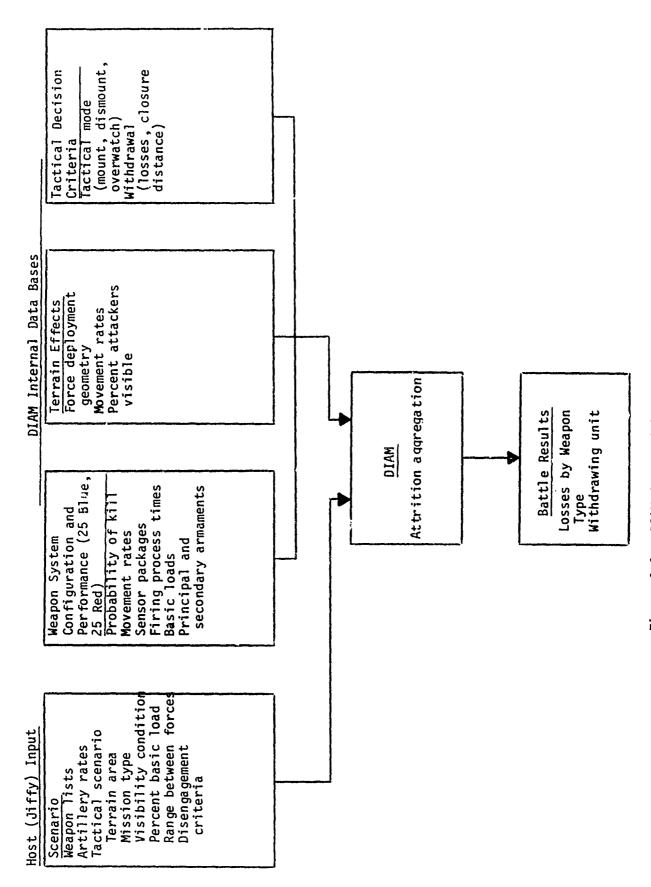


Figure 1-1. DIAM data and information flow.

with other Jiffy results. However, DIAM is structured so that lethal area/target density artillery loss algorithms could easily be implemented in the module.

- (3) Tactical scenario. Host selection of the tactical scenario is also required. The DIAM module currently has a library of six terrain areas available. The user is required to select a terrain location and denote either the Red or the Blue force as attacker. DIAM responds by accessing the proper terrain data base and arraying the user-defined forces on the terrain. The visibility condition (day, night, or obscured) is also required by the module. Two other host data elements are required to describe the DIAM battle framework. The initial condition of both forces is represented by the percent of basic load available to each weapon type and the opening ranges between the forces. The opening range must be less than 1000 meters. The host data element describing disengagement criteria is an optional requirement. The DIAM structure allows the host to specify attrition thresholds and range thresholds for each weapon type. These thresholds represent maximum loss levels and minimum closure distances to enemy force elements that will be sustained by a force prior to its withdrawal. Violation of these thresholds for either force will initiate its withdrawal. If the user does not specify these thresholds, they will be specified by the DIAM module.
- b. <u>Internal Data Base</u>. The DIAM module also maintains an extensive internal data base. Referring again to figure 1-1, the model has access to a computerized library describing various terrains and weapon systems. These library entries are accessed by the module in response to host requirements. The libraries fall into the following categories:
- (1) Weapon system configuration and performance. These data describe weapon system performance under various postures (attack or defend) and environmental conditions (day, night, obscured day). They are supplied by the US Army Materiel Systems Analysis Activity (USAMSAA) and the Night Vision and Electro-optics Laboratory (NV&EOL). The elements of this part of the data base are:
  - . Single shot kill probabilities for each ammunition against each platform type in both defensive and attack postures. Platforms are representative of both vehicles and personnel.
  - . Movement rates under day and night conditions by platform type.
  - . Time required by sensors to detect a target at various ranges. DIAM divides its sensors into four categories: unaided eye, optically aided eye, generic image intensifier, and generic thermal device.
  - . Time required to aim, fire, guide, and reload for each weapon system.

- . Principal armaments and basic loads for each platform. Weapon platforms (personnel, vehicles, crews) can carry multiple weapons in DIAM. For example, an infantry Dragon gunner can also engage personnel targets with a rifle.
- (2) Terrain effects on vehicles and personnel.
- (a) The terrain data base contains data representing an important tactical aspect of the DIAM battle. Each of the weapons selected by the DIAM user is assigned to one of four general groups:
  - . Personnel
  - . Heavy armor vehicles
  - . Light armor vehicles
  - . Systems offset from the battle by more than 1000 meters (e.g., mortars, TOW).

These categories are used by DIAM to establish movement locations and the tactical geometry of the force structures. The module considers the center of mass for each group for all calculations involving movement and range parameters. The tactical terrain data base contains initial locations for the center of mass of each DIAM group and is used by the module to deploy weapon systems in a representative tactical array at the beginning of each battle.

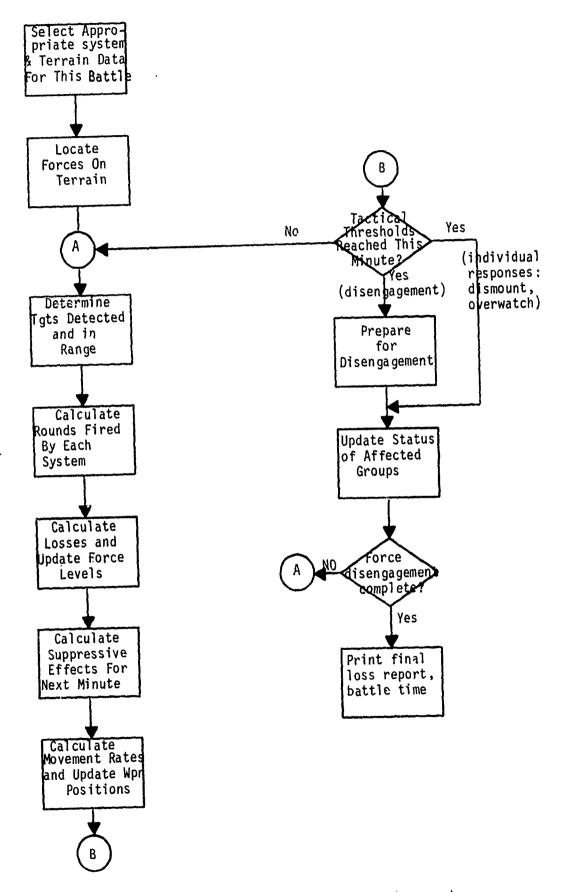
- (b) The terrain effects data base is used by DIAM to determine the percent of each force visible to firers in the opposing force. This data base was developed using defensive positions and attacker approach routes resulting from a map analysis conducted by CASAA and the US Army Infantry School. The CASAA Battlefield Visualization Graphics computerized terrain system was used to analyze the area along the avenues of approach visible to each defensive position. This provided the percent of the attack corridor visible in range bands of 200-meter increments to each defensive position. As the DIAM attrition module moves the threat forces along the attack corridors, the percent of corridor visible is applied to the force, providing number of systems that can be targeted by the defenders. DIAM currently has a library of six different terrain tactical situations. Analytical procedures to develop data bases for new situations require approximately 2 mandays. A discussion of these procedures can be found in Chapter 2 of this report.
  - (3) Tactical decision criteria.
- (a) The DIAM module simulates tactical responses of both individual weapon systems and the force to battle conditions. Individual tactical responses are limited to the following:
  - . Personnel riding in light armor vehicles may dismount for an assault.
  - . Dismounted personnel withdrawing from the battle may mount available light carriers.
  - . Light armored vehicles may take up overwatch positions.

These tactical responses are triggered by closure distances between the groups. For example, the Red commander may want 50 percent of all mounted personnel to dismount their carriers when they move within 300 meters of the Blue defender's dismounted Viper positions. The tactical data base contains the desired range at which the tactic must be executed, the percent of the group required to perform the tactic, and an identifier of the opposing group triggering the tactic. Under conditions requiring a DIAM group to operate in two tactical modes (in the example, 50 percent personnel mounted, 50 percent dismounted), the module splits the group to represent movement and location characteristics of both groups.

(b) Force tactical responses are centered around the decision to withdraw from the battle. As mentioned previously, the host can optionally provide criteria (percent of force lost, range between groups) to trigger withdrawal. If these are not provided by the host the module defaults to the values found in this data base. DIAM's current implementation in Jiffy allows the gamer to override the withdrawal criteria (either stay and fight or move out) following status reports, which are given at selected intervals during the DIAM battle.

#### 1-3. ALGORITHMS USED IN DIAM.

a. Figure 1-2 presents a generalized logic flow of the processes occurring in the DIAM module. The purpose of this diagram is to provide a framework for consideration of the attrition algorithms used in the module. The DIAM module is a deterministic model using expected value techniques for calculating weapon losses to both forces. DIAM first selects the appropriate weapon system data and terrain data for the battle to be played, then locates the forces in their tactical positions on the terrain. For each battle minute, DIAM constructs a firing profile for each weapon system. This profile consists of the number of targets visible and within range that are detected by the system. On the basis of this profile, the model calculates the rounds fired by each system. Losses to each firer and target are then determined, and force levels are updated. The number of incoming rounds and the losses sustained by the force are used to calculate suppressive effects for the next minute of battle. Suppression affects rate of fire, movement, and vulnerability. After suppressive effects are calculated, movement rates are determined and force weapon positions are updated for the current minute. Tactical thresholds are then compared with current positions and force levels. If the disengagement criteria are satisfied, tactical requirements (for example, mounting of vehicles) are performed and a timer is set for the disengagement period. Individual tactics also may be altered (dismount, overwatch) in response to tactical thresholds. A new terrain data base is retrieved from the module library to represent reduced visibility conditions between forces during disengagement and pursuit, and the status of affected groups is updated. DIAM assumes that disengagement is completed after 10 minutes. A final battle report is printed following disengagement.



( . 16 , 400) - 15 page 14, 41 -

Figure 1-2. DIAM Logic Flow for Both Attackers and Defenders. 1-7

- b. The following paragraphs provide a detailed description of the algorithms used for calculation of rounds fired, determination of losses, calculation of suppressive effects, and calculation of group movement. The remaining steps are primarily model bookkeeping and are documented in the DIAM computer code found in chapter 3.
- (1) Calculation of rounds fired. The maximum number of rounds fired per minute by weapon i at target j is  $R_{ij}$ , which is the reciprocal of the time required to fire one round at the given target; i.e.,  $R_{ij} = 1/T_{ij}$ .

$$T_{ij} = (D_{ij}/F_{ij} + A_{ij} + L_i + M_{ij}) N_{ij}/N_i$$
 (1-1)

where:

T<sub>ij</sub> = expected time in minutes for a weapon of type i to fire at a target of type j, given a uniform distribution of fire at all targets available.

D<sub>ij</sub> = expected number of minutes for a weapon of type i to detect a
 weapon of type j.

 $F_{ij}$  = number of rounds fired by i at j per detection.

 $A_{i,i}$  = expected number of minutes required to aim i at j.

 $L_i$  = expected number of minutes to reload i.

 $M_{ij}$  = expected number of minutes for projectile from i to reach j.

 $N_{ij}$  = expected number of targets of type j visible to firer i.

 $N_i$  = expected number of targets of all types visible to firer i.

(a) This firing rate assumes targets are of equal priority and are allocated uniformly across all targets visible and detected by the firer. If other types of allocations are desired, it is only necessary to change the fraction  $N_{i,j}/N_i$  to the desired weighting method. The number of targets visible  $N_{i,i}$  is calculated in the following manner:

$$N_{ij} = n_j(1-\overline{v}) v_{IJ} (1 - \frac{S_j}{2})$$
 (1-2)

where:

 $n_i$  = the total number of target weapons of type j in the target force.

 $\overline{v}$  = the fraction of the terrain corridor containing target weapon system j not visible to any of the firing force containing system i.

- v<sub>IJ</sub> = the fraction of the terrain corridor containing target systems of category J visible to all firing weapons of category I. Recall that all weapon systems fall into one of four categories (dismounted personnel, heavy vehicles, light vehicles, mcrtars). In this case J is the category containing the target system j and I is the category containing the viring system i. These visibility fractions vary by 200-meter range bands as mea ared between weapon systems i and j.
- $S_j$  = the fraction of targets of type j suppressed for this minute. The factor  $\frac{S_j}{2}$  represents DIAM's modeling of one-half of all suppressed personnel<sup>2</sup> in a temporary covered position.
- (b) This firing rate  $(R_{ij})$  is for unsuppressed situations—suppression will reduce this rate as follows:

$$R'_{ij} = R_{ij} S_{it}$$
 (1-3)

where:

 $R_{ij}$  = suppressed firing rate of weapons of type i at targets of type j.  $R_{ij}$  = unsuppressed firing rate of weapons of type i at targets of type

 $S_{it}$  = suppression factor for firing times of weapon i at time t.

- (2) Calculation of loss rates.
- (a) The expected number of weapons (considered as targets) of type j killed by weapons in the opposing force of type i is determined from the following equation:

$$K_{ij} = N_{ij} (1 - (1 - P_{ij}/N_j)^{R'_{ij}}^{\prime} \alpha_i^{C_{ij}})$$
 (1-4)

where:

 $K_{ii}$  = the expected number of type j weapons killed by type i weapons.

 $N_{ij}$  = the expected number of type j weapons visible to weapons of type i.

 $P_{i,i}$  = the single shot kill probability of weapon i against weapon j.

 $R_{ij}$  = suppressed firing rate of weapons of type i at targets of type j (from equation 1-3).

 $C_{i,i}$  = number of weapons of type i firing at targets of type j.

 $\alpha_i$  = the fraction of aimed rounds fired by weapon system i. For attackers,  $\alpha_i$  = 0.30. For defenders  $\alpha_i$  = 0.60.

(b) The number of weapons of type i firing at target type j is given by:

$$C_{ij} = n_i v_{JI} (1 - \frac{S_i}{2})$$
 (1-5)

where:

n; = the total number of weapons of type i in the firing force.

v<sub>JI</sub> = the fraction of firing positions of weapons in category I visible to target weapons in category J. Note that the use of v<sub>IJ</sub> in the computation of the number of targets and v<sub>JI</sub> in computing the number of firing weapons causes the following representation in the model: the number of firers engaging targets j are only those that have physical line of sight to j (represented by v<sub>JI</sub>). Likewise, the number of targets j engageable by i are only those that can be seen by i (represented by v<sub>IJ</sub>).

 $S_{i}$  = the fraction of firing systems of type i suppressed for this minute.  $S_{i}/2$  indicates that one-half of all suppressed weapons in DIAM do not fire.

(c) Equation 1-4 is consistent with the assumption that targets are selected at random with replacement. Bash and Inselmann (1979) derived the equation. Also developed there is the equation for determining the expected number of kills when more than one type of weapon is firing at one target type and all targets can be engaged by all weapons:

$$L_{j} = (1 - II - II - \frac{K_{ij}}{N_{ij}})) N_{ij}$$
 (1-6)

where:

 $L_{j}$  = expected number of losses per minute of weapons of type j.

K<sub>ij</sub> = expected number of type j weapons killed by type i weapons (from equation 1.4).

 $N_{i,j}$  = number of weapons of type j in force visible to weapons of type i.

Equations 1-4 and 1-6 produce an approximation to the situation where different weapons see different subsets of targets.

(3) Calculation of suppressive effects. The DIAM suppression module was taken from the Jiffy war game. This module provides suppression of the firing rates and movement rates for both dismounted personnel and vehicular mounted armaments. The following four equations are used to calculate the suppressive effects in DIAM.

$$Y_i = W_i (2.06 X + 1.54)/100$$
 (1-7)

$$Y_i = W_i (1.06 \times + 0.14)/100$$
 (1-8)

$$Y_i = W_i (8 \times 1.5 + 3.28)/100$$
 (1-9)

$$Y_i = W_i (2.5 \times 1.5 + 0.5)/100$$
 (1-10)

where:

 $Y_i$  = fraction of weapons of type i that are suppressed.

X = ratio of total losses suffered by weapons of type i from direct fire, artillery, and mines to total losses inflicted by weapons of type i.

W<sub>i</sub> = 1 for category 4 (heavy) weapons and 2.86 for all other types of weapons (from Jiffy).

Equation 1-7 is for defenders in the engagement phase, 1-8 is for defenders in the withdrawal phase, 1-9 is for attackers in the engagement phase, and 1-10 is for attackers in the withdrawal phase. The maximum suppression for firing is set at 0.8 and the maximum for movement is 0.9. Suppressed systems are less lethal and less vulnerable (see use of  $S_i$ ,  $S_j$  in equations 1-2, 1-3, and 1-5). Lethality and mobility are assumed to be reduced because systems being suppressed will seek available cover. This in turn is assumed to make the system less vulnerable.

- (4) Calculation of movement rates and tactical locations.
- (a) The movement rate for each weapon is calculated by reading the unsuppressed rate for this terrain and tactical scenario from the data base and then applying the suppression factor:

$$M'_{it} = M_i (1-V_{it})$$
 (1-11)

where:

 $M_{it}$  = suppressed movement rate for weapon i at time t.

M<sub>i</sub> = unsuppressed movement rate from data base.

V<sub>it</sub> = fraction of movement suppressed by previous incoming fire.

These rates are adjusted so that weapons in overwatch positions do not move and any vehicles with dismounted personnel will move at the dismounted rate in the meeting and engagement phase of the battle.

(b) Tactical geometry is represented by locating the components of each force about a central force reference point. Each weapon played in the model is categorized as belonging to one of four groups (dismounted personnel, heavy armor, light armor, or mortars). The initial locations of the center of each group with respect to the force reference point are maintained as part of the data base for each tactical scenario available for play in the DIAM submodel. Selection by the main program of a particular scenario causes the DIAM submodel to modify the position of each weapon group based on the following formula.

$$LR_{j0} = D + \Delta_{J}$$
 (1-12)

$$LB_{i0} = D + \Delta I \qquad (1-13)$$

where:

 $LR_{j0}$  = location of all Red weapons of type j at time zero.

 $LB_{10}$  = location of all Blue weapons of type i at time zero.

D = range between center of mass of forces at start of the battle.

- $\Delta_{\rm I}$ ,  $\Delta_{\rm J}$  = the offset distance of one of four weapon categories from the center mass of the force.  $\Delta_{\rm I}$  is the offset for all Blue weapons of category I. Likewise,  $\Delta_{\rm J}$  is the offset for all Red weapons of category J.
- (c) Each weapon location is changed each minute based upon a suppressed movement rate such that the location at any time (t + 1) minutes into the battle is defined by:

$$LR_{j,t+1} = M_{jt}' + LR_{jt}$$
 (1-14)

where:

 $LR_{j,t+1}$  and  $LP_{jt}$  = the location at time t+1 and t respectively of weapon j.

# Mjt = the suppression of movement for weapons j during minute t.

The DIAM battle begins with the attacking force moving toward the defensive positions. Losses are assessed to both forces until a tactical threshold is reached. At this point the withdrawal phase of the battle is begun. This is simulated by a change in the percent visible tables (representing a force minimizing intervisibility with the enemy as it breaks contact). The model moves the withdrawing forces out of firing range and then prints the losses to both Red and Blue forces.

#### 1-4. REFERENCES.

Bash, D. and Inselmann, E., 1979, <u>Target Selection Assumptions and Their Effects on an Assessment Equation</u>. Technical Paper 2-79, US Army Combined Arms Center, Fort Leavenworth, KS.

Godfrey, L., Etheridge, E., Arrington, S., and Pickett, H., 1981, Dismounted Infantry Aggregation Methodology (DIAMS). Technical Report 6-81, US Army Combined Arms Center, Fort Leavenworth, KS.

#### CHAPTER 2

#### DIAM FILE STRUCTURES

## 2-1. DIAM INTERNAL DATA BASE.

- a. The DIAM internal data bases are used by the model to describe weapon performance, the terrain effects on the surviving force, and the tactical disengagement criteria. The data are stored on five random access files as shown in figure 2-1.
- (1) The Weapon Vulnerability file (Logical Unit 16) contains probabilities of kill for 25 Blue weapons and 25 Red weapons. The probabilities are stored in a range-dependent manner. Two files exist, one representing Blue in prepared defensive positions and the other representing Blue in an attack.
- (2) The Terrain Effects file (Logical Unit 25) contains data describing the percentage of the opposing force visible to both attackers and defenders. The percentages are both weapon and range dependent. Six terrain sites (four in the Mideast and two in Europe) are currently available in the DIAM model.
- (3) The Movement Rates file (Logical Unit 20) contains rates of advance for four weapon categories; i.e., dismounted personnel, heavy armored systems, light armored systems, and mortars. The movement rates are dependent on terrain type and visibility conditions.
- (4) The Target Acquisition Rate file (Logical Unit 20) provides average acquisition times for four sensor types (optical systems .4  $\mu$  -.7  $\mu$ , image intensifier systems .7  $\mu$  -1.1  $\mu$ , far infrared systems 8  $\mu$  -14  $\mu$ , and the unaided eye) detecting four target types (vehicular target fully exposed or in hull defilade and personnel target fully exposed or in foxhole). The acquisition times are dependent on target range and atmospheric visibility.
- (5) The Weapons Characteristics file (Logical Unit 15) is used to describe the primary sensor type, movement rate category, and basic load of the primary armament for each of the 25 Blue and 25 Red weapons found in the Weapon Vulnerability file. For several weapon systems the DIAM model considers both a primary and secondary armament. For dismounted personnel carrying a Dragon or Viper, the model also plays rifle fire against opposing personnel targets. The basic loads for secondary systems are updated by the DIAM model logic and are not contained in this data base.
- b. It will be noted from figure 2-1 that DIAM uses the random access file in a read only mode. The random access structure provides the user with flexibility in selecting weapon systems, terrain type, and environmental conditions for play in the dismounted battle. The following paragraphs provide detailed descriptions of the file structures. To avoid classification of this report, example data bases are not included. However, example data bases can be obtained from the US Army Combined Arms Studies and Analysis Activity. Fort Leavenworth, KS upon submission of proper clearances.

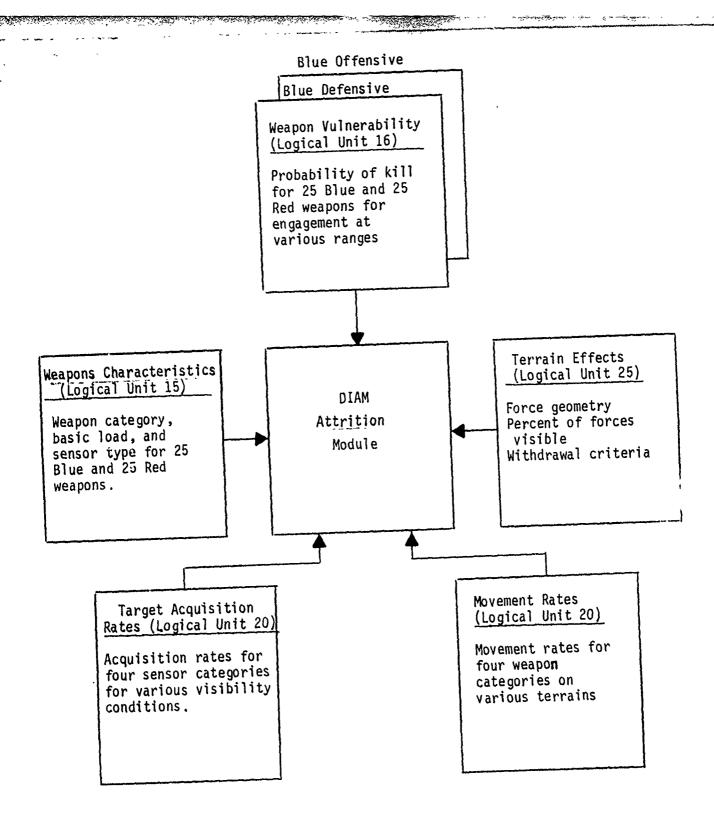


Figure 2-1. DIAM internal data bases.

# 2-2. FILE STRUCTURE FOR TERRAIN EFFECTS.

- a. The terrain effects data are used by the model to represent the percent of forces visible to both attacker and defender during the battle. This data base is developed using digitized terrain and military judgment in selecting the best approach routes and defensive positions for a particular terrain location. Figure 2-2 shows the first step in developing this data base. A piece of digitized terrain has been selected representing the battle site. The possible approach routes have also been noted on the map.
- b. The second step in data base development is shown in figures 2-3 and 2-4. Defensive positions have been selected representing typical positions for two of the weapon categories. Line-of-sight fans representing the visible portions of the advance routes have also been drawn using the digitized terrain data base.
- c. The final step in data base development is to calculate the percent of attacker corridor visible by range band for each of the defender positions. The resulting percents are used in the terrain effects data base.
  - d. The structure of the random access file is as follows:

# Record 1

Record	Data	Data
Word	<u>Type</u>	<u>Description</u>
1-20	Alphanumeric	Each word contains four alpha characters. The record contains a description of the terrain; e.g., "GERMANY BLUE ATTACK WOODED AREA".

#### Record 2

Record Word	Data <u>Type</u>	Data <u>Description</u>
1	Real	Percent Red dismounted visible to Blue dismounted, range 0-200m.
2	Real	Percent Red mortars visible to Blue dismounted, range 0-200m.
3	Real	Percent Red light armor visible to Blue dismounted, range 0-200m.

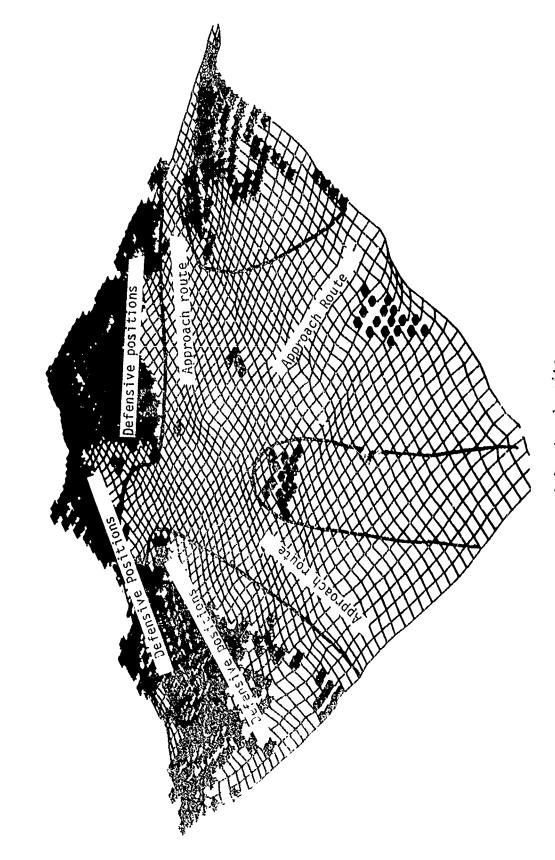


Figure 2-2. % t's site.

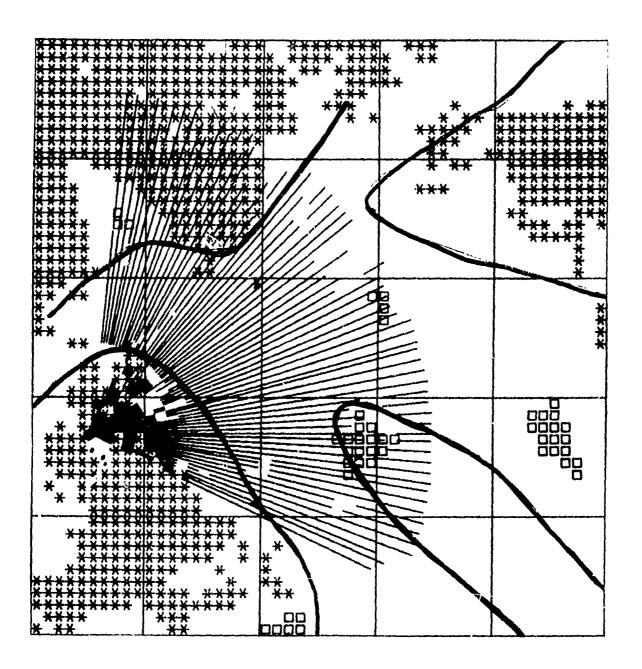


Figure 2-3. Line-of-sight fan for a TOW position.

Figure 2-4. Line-of-sight fan for a small arms positions.

Record Word	Data <u>Type</u>	Data <u>Description</u>
4	Real	Percent Red heavy armor visible to Blue dismounted.
5-8	Real	Percent Red dismounted, mortars, light armor, heavy armor visible to Blue mortars.
9-12	Real	Percent Red dismounted, mortars, light armor, heavy armor visible to Blue light armor at 0-200m.
13-16	Real	Percent Red dismounted mortar, light armor, heavy armor visible to Blue heavy armor at 0-200m.

# Records 3-6

Contain the same information for Red targets at ranges of 201-400, 401-600, 601-800, and 801-1000 meters.

# Records 7-11

Contain the percent of Blue visible to Red during the engagement phase of the battle. The structure is similar to that used for records 2-6.

# Records 12-21

Contain the percent of Red and Blue visible during Blue withdrawal. The structure is similar to that used for records 2-6.

## Records 22-31

Contain the percent of Red and Blue visible during Red withdrawal. The structure is similar to that used for records 2-6.

## Record 32

Contains the tactical offset distance of the centroids of the Blue weapons categories (dismounted personnel, mortars, light armor, heavy armor) from the Blue force centroid. It also contains similar Red tactical offset distances.

Record	Data	Data
Word	<u>Type</u>	Description
1	Rea1	Tactical offset of Blue dismounted personnel from Blue force centroid (meters).

Record Word	Data Type	Data Description
2	Real	Tactical offset of Blue mortars (meters).
3	Real	Tactical offset of Blue light armor (meters).
4	Real	Tactical offset of Blue heavy armor (meters).
5	Real .	Tactical offset of Red dismounted personnel from Red force centroid (meters).
6	Real	Tactical offset of Red mortars from Red force centroid.
7	Real	Tactical offset of Red light armor from force centroid (meters).
8	Real	Tactical offset of Red heavy armor from force centroid (meters).

Record 33

Contains the corridor width (meters) for the attacker.

Record Word	Data <u>Type</u>	Data <u>Description</u>
1	Real	Corridor width in meters at ranges of 0-200m from force centroid. The corridor is for attacking dismounted personnel.
2-5	Real	Corridor widths for dismounted personnel at ranges of 201-400m, 401-600m, 601-800m, 801-1000m.
6-10	Real	Corridor widths for mortars at ranges of 0-200m, 201-400m, 601-800m, 801-1000m.
11-15	Real	Corridor widths for light armor at range of 0-200m, 201-400m. 601-800m, 801-1000m.
16-20	Real	Corridor widths for heavy armor at ranges of 0-200m, 201-400m, 601-800m, 801-1000m.

# Record 34

Contains the corridor widths for the defender withdrawing. The structure is identical to record  $33.\,$ 

# Record 35

Contains the corridor widths for the attacker withdrawal routes. The structure is identical to record 33.

# Record 36

Contains the maximum percent of weapons that will be lost before withdrawal. The numbers represent tactical decision thresholds upon which the unit commander bases the withdrawal decision.

Record Word	Data <u>Type</u>	Data Description
1	Real	Maximum percent of Blue dismounted lost before Blue withdrawal.
2	Real	Maximum percent of Blue mortars lost before Blue withdrawal.
3	Real	Maximum percent of Blue light armor lost before Blue withdrawal.
4	Real	Maximum percent of Blue heavy armor lost before Blue withdrawal.
5-8	Real	Maximum percent of Red dismounted, mortars, light armor, and heavy armor lost before Red withdrawal.

- 2-3. FILE STRUCTURE FOR WEAPON VULNERABILITY. The Weapon Vulnerability file is divided into two sections.
- a. The first section contains 125 records describing the ability of 25 Blue weapons to kill 25 Red weapons in five range bands 0-200m, 201-400m, 401-600m, 601-800m, and 801-1000m. The records are structured as follows:

# Record 1

Record Word	Data Type	Data Description
1	Alpha	Six-character name for Blue weapon 1.
	. Real	Probability of kill of Red weapon 1 by Blue weapon 1 at a range of 0-200m. (Probability of kill represents a catastrophic killboth mobility and firepower).
3	Real	Probability of kill of Red weapon 2 by Blue weapon 1 at a range of 0-200m.
•	•	•
•	•	•
•	•	•
26	Real	Probability of kill of Red weapon 25 by Blue weapon 1 at a range of 0-200m.

# Records 2-5

Describe the ability of Blue weapon 1 to kill 25 Red weapons in the remaining four range bands. The first 125 records on the file are required to describe all 25 Blue weapons.

b. The second section of this file, records 126 through 250, contains probabilities of kill for Red weapons firing against Blue targets. These records are structured the same as the Blue lethality records. This file is read in DIAM by subroutine PKIN.

#### 2-4. FILE STRUCTURE FOR WEAPON MOVEMENT RATES.

- a. Data in the Movement Rates file is used by DIAM to advance four attacker categories during the engagement phase of the battle and to move the withdrawing systems during the withdrawal phase of the battle. The rates represent rates of advance achievable under unsuppressed conditions. The rates are adjusted by DIAM to represent the suppressive effects of personnel and vehicular losses. The movement rate data must be described in meters per minute.
- b. The file contains rates for four weapon categories (dismounted personnel, mortars, light armor, heavy armor) on two terrains (open and heavily vegetated). The file is structured into three sections keying on three visibility conditions (clear day, clear night, and heavily obscured day).
- (1) The first section consists of two records describing Blue and Red movement rates on a clear day (visibility range greater than 15km). The records are structured as follows:

# Record 1

Record Word	Data <u>Type</u>	Data <u>Description</u>
1	Real	Movement rate of dismounted Blue in open terrain (meters/min).
2	Real	Movement rate of Blue mortars in open terrain (meters/min).
3	Real	Movement rate of Blue light armor in open terrain (meters/min).
4	Real	Movement rate of Blue heavy armor in open terrain (meters/min).
5-8	Real	Movement rate of Blue dismounted, mortars, light armor, and heavy armor in close, heavily vegetated terrain.

#### Record 2

Describes Red's movement in open and close terrain on a clear day.

- (2) The second section contains two records describing Blue and Red movement rates at night. The form of records 3 and 4 is identical to records 1 and 2.
- (3) The third section contains two records describing Blue and Red movement rates on a heavily obscured day (visibility range of 500 meters). The form of records 5 and 6 is identical to records 1 and 2.

#### 2-5. FILE STRUCTURE FOR TARGET ACQUISITION RATES.

- a. The Target Acquisition file data describe the ability of four generic sensor types to detect four types of targets at various ranges. The generic sensor types are unaided eye, optically aided eye, far infrared thermal imager, and image intensifier device. The targets being detected are personnel fully exposed, personnel in foxholes, armored vehicles fully exposed, and armored vehicles in hull defilade. The data represent average times for each sensor to detect each target at various ranges. The file is divided into three sections. Each section represents detection capabilities under conditions of clear day, clear night, and obscured night.
  - b. The first section, representing clear day, is structured as follows:

# Record 1

Record Word	Data <u>Type</u>	Data <u>Description</u>
1	Real	Average time for Blue eye to detect a fully exposed vehicle at 0-200m (min/target).
2-4	Rea1	Average time for Blue eye to detect a hull defilade vehicle, fully exposed soldier, or soldier in defilade at 0-200m.
5-8	Real	Average time for a Blue optical system to detect four target types at 0-200m.
9~12	Real	Average time for a Blue thermal imager to detect four target types at 0-200m.
13-16	Rea1	Average time for a Blue image intensifier device to detect four target types at 0-200m.

#### Records 2-5

Consider Blue's ability to detect four Red targets on a clear day at target ranges of 201-400m, 401-600m, 601-800m, and 801-1000m. Their structure is identical to record 1.

#### Records 6-10

Contain detection times for four generic Red sensors to acquire four Blue targets in five equal range bands from 0 to 1000m. The structure of these records is identical to records 1-5.

- c. The second section contains records 11-20. These records describe Blue and Red ability to detect targets on a clear night. The structure of these records is identical to records 1-10.
- d. The third section contains records 21-30. These records describe Blue and Red ability to detect targets on an obscure day (visibility range 500m). The structure of these records is identical to records 1-10.

では、1918年の1

## 2-6. FILE STRUCTURE FOR WEAPONS CHARACTERISTICS.

- a. The Weapons Characteristics file contains data describing the physical characteristics of 25 Blue systems and 25 Red systems. The data on each weapon system are used by the DIAM model to construct firing rates for each weapon. The file also contains pointers to the Movement Rates file and Target Acquisition file for each system, allowing DIAM to retrieve the proper movement and detection rates for each system.
- b. The file is structured into two sections. The first section contains 25 records describing Blue weapon characteristics. The second section contains 25 records describing 25 Red weapons. The records have the following structure:

Record <u>Word</u>	Data <u>Type</u>	Data <u>Description</u>
1	Alpha	Six-character weapon name.
2	Integer	The type of primary sensor contained on this weapon: l=eye, 2=optic, 3=thermal, 4=image intensifier.
3	Real	Round flight time of primary armament (seconds/200 meters).
4	Real	Number of rounds (bursts for burst fire systems) carried by this weapon.
5	Integer	Weapon platform movement category: l=dismounted personnel, 2=mortars, 3=light armor, 4=heavy armor.
6	Real	Weapon firing cycle time. This represents the average time to aim, fire, and reload the weapon (seconds). Munition guidance time should not be included in this value.

The Blue weapons described in this file must be in the same order as their probability of kill records appear on the Weapon Vulnerability file.

## CHAPTER 3

### DIAM PROGRAM CODE

## 3-1. INTRODUCTION.

- a. This chapter contains information on the DIAM program code. This introductory paragraph discusses programming philosophy, concepts, and techniques used in constructing the code for DIAM. The second paragraph describes the functional areas of DIAM and presents a system flowchart. The third paragraph contains figures and tables that briefly explain the subroutines called from each functional area and the primary variables influenced by each subroutine. Paragraph 3-4 explains the self-documenting concept used in DIAM with examples. Paragraph 3-5 contains the DIAM code as a subroutine called by subroutine INFANT of Jiffy.
- b. The following guidelines were used in developing the DIAM code to allow for easier understanding, maintenance, and modification of the DIAM model.
- (1) First, all subroutines are no longer than 150 lines and are functional in application. Efforts were made to keep the length around 50 lines, and only a few subprograms are over 80 lines. The biggest exception is the main DIAM subroutine, which is around 500 lines. However, this main subroutine consists of functional areas or separate procedures of less than 50 lines each.
- (2) Second, the DIAM structure is basically two-level. Only the main DIAM subroutine passes control to and from each subroutine in a top-down process. (A third level is occasionally used when subroutine INIT is called to initialize an array.) This design allows for easier understanding of structure flow than do higher level structures.
- (3) Third, the DIAM structure includes IF/THEN/ELSE statements, no common blocks, and self-documenting code. IF/THEN/ELSE programming avoids "GO TO" programming; with proper indentation this makes the structure flow easier to understand. No common blocks allows better control of debugging and testing. The self-documenting technique, explained in paragraph 3-4, was used to facilitate understanding, debugging, and future modification of the DIAM code. With this technique, each subroutine contains all information and only that information needed to understand the function of the subroutine.
- 3-2. DIAM FUNCTIONAL AREAS. This section contains a brief overview of the functional areas in DIAM. Figure 3-1 is a functional flow diagram of the model.
- a. As shown in the figure, the low resolution data are loaded first. Since DIAM's first implementation was in conjunction with the Jiffy Model, the low resolution data are releived from Jiffy. These data could be loaded by subroutine calls from the main DIAM subroutine if DIAM were used with other models or executed independently. The low resolution data include Blue and

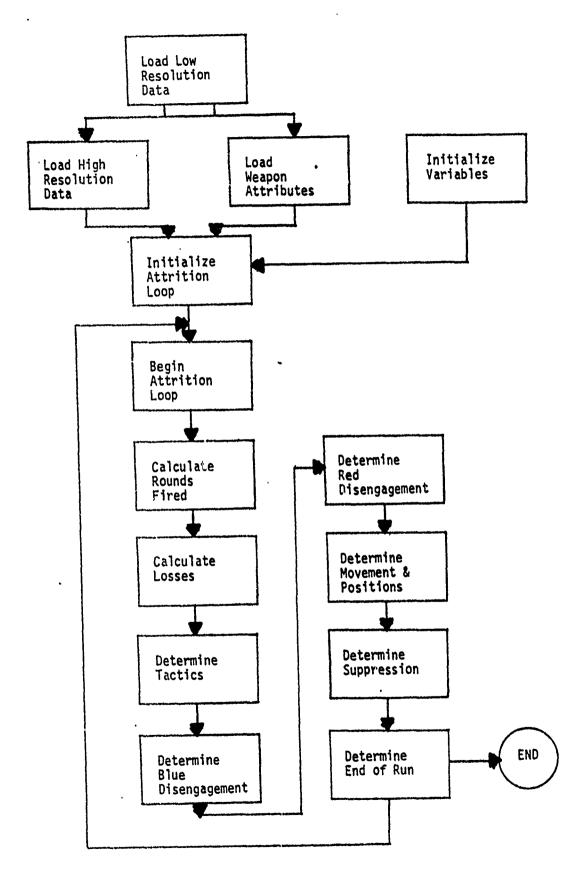


Figure 3-1. Flow chart of DIAM module.

Red weapon systems and scenario information. Predetermined artillery losses from Jiffy are also included, but artillery could be modeled differently in DIAM for different applications.

- b. After a gamer selects the type and number of weapon systems and a tactical scenario from the DIAM library, the DIAM model selects the appropriate high resolution data and weapon attributes.
- (1) The high resolution data contain terrain information for both forces, including visibility factors, attacker corridor widths, and disengagement criteria. This information is contained in a library and is accessed by the type of tactical scenario. Currently, the library contains terrain data for only a few terrain types. These scenarios require minimal set-up time (approximately 2 days). In the future as many as 30 scenarios will be available for access.
- (2) The weapon attributes selected are from a data base developed for all possible weapons played in DIAM. DIAM allows a maximum of 10 weapons per side in a run. Weapon attributes include probability of kill, weapon characteristics, movement rates, and detection times for all Red and Blue weapon types selected for a given scenario.
- c. The next two functional areas are initialization procedures. The first procedure initializes variables, arrays, indexes, and counters. The second procedure initializes ammunition loads, artillery losses per minute from Jiffy, and distances from the force centroid to its weapons for both Red and Blue forces. Defending minefields can then be entered, and the force visibility tables are initialized. Both forces are entered as dismounted forces. The attacking force then mounts its vehicles after the number of troops to mount is determined, and the attrition calculations are ready to begin.
- d. The attrition loop starts by determining the distance between Red and Blue weapon types and their respective range bands. The range bands are then used to determine the visibility factors and the probability of kill between Red and Blue weapon types during the current minute.
- e. Using this information, the next procedure calculates rounds fired by each Red and Blue weapon type. The results are calculated by a sequence of subroutines that first determines number of engageable targets, time to engage targets, rounds to kill targets, and time to kill targets. From this information, the projected rounds required to kill all engageable targets for each weapon type are calculated. These rounds are limited in the final subroutine to one-fourth the available ammunition to determine the actual rounds fired.
- f. The next functional area calculates total Red and Blue weapon type losses during the minute. The primary attrition loss calculation occurs in the first two subroutines using the equations developed in chapter 1 where

terminal for the state of the second second

initial losses, and then total expected losses, are calculated for all weapon types. Artillery and minefield losses are then determined before the mounted infantry personnel losses are calculated. Mounted personnel losses are determined from the losses of troop carriers and proportioned uniformly across the number of personnel inside the troop carriers. The Red and Blue losses are tallied, and the remaining Red and Blue weapon types are determined. The last subroutine of this procedure generates a killer/victim scoreboard for both Red and Blue weapon types.

- g. New tactics are determined in the next procedure. Currently, DIAM plays two tactical modes: infantry personnel can dismount troop carriers at a chosen distance from the opposing force, and a percentage of armor vehicles can go into overwatch, also at a chosen distance. After new tactics are determined a killer/victim report is generated for the gamer at chosen minute intervals. The gamer then has the option of continuing the engagement or withdrawing one of the forces.
- h. The next two procedures determine if Red or Blue forces disengage. As mentioned previously, the gamer can trigger a withdrawal. If not, attrition losses are checked every minute, and a force will disengage at a chosen attrition loss level. At this point, the gamer can again override the disengagement and continue the battle. Hence, in DIAM the gamer can have complete control of engaging and withdrawing forces or allow the battle to automatically disengage forces at chosen attrition levels.

- i. New positions are calculated after disengagement is determined. The attacker moves forward if engaging or pursuing the withdrawing defender. The defender always remains stationary unless withdrawing.
- j. One of the last procedures calculates fire and movement suppression for Red and Blue forces. This procedure is processed last since suppression is calculated as losses received divided by losses inflicted for each weapon type. During the first minute fire suppression is assumed to be 50 percent. Currently, suppression in DIAM is consistent with the method of suppression play in Jiffy where firepower ratios are used.
- k. Finally, the last procedure determines if the attrition loop continues or ends. Currently, 1000 minutes is the limit during Red and Blue engagement. When either force is withdrawing the battle continues 10 minutes before ending.
- 3-3. SUBROUTINE SUMMARY. Table 3-1 provides a cross-referenced summary of the DIAM subroutines and their primary variables. Subroutines called by each functional area are shown, and the function of each subroutine is described. The primary variables for each subroutine are listed and described.
- 3-4. DIAM SELF-DOCUMENTATION CONCEPT. This paragraph explains the self-documenting technique and variable name convention used in DIAM.

Table 3-1. DIAM Subroutine Summary (continued next page)

		uring ithdrawing le to Blue uring ithdrawing ble to Red centroid d force g Blue force g Red force g Red force	ray ay	
Primary Variable Description	Blue force type index Red force type index Defense posture index Tactics array	Percent Red visible to Blue during engagement Percent Red visible to Blue withdrawing Percent Blue visible to Red during engagement Percent Blue visible to Red during engagement Percent Blue visible to Red withdrawing Percent Blue withdrawing visible to Red Offset distance between force centroid and weapon category centroid Corridor width for attacking force Corridor width for withdrawing Blue force Corridor width for withdrawing Red force Corridor width for withdrawing red force Corridor width for withdrawing red force categories	SSPK for Blue vs Red Targets SSPK for Red vs Blue Targets Blue weapon characteristic array Red weapon characteristic array	Blue movement rate Red movement rate Blue detection times Red detection times
Primary Variables	BFRCTP RFRCTP DPSTR TACA	PCRVBE PCRVBW PCRWVB PCSVRE PCBVRW PCBWVR DFCWC *AWDTH *BWDTH *BWDTH DGMATT	BRPK RBPK BCHR RCHR	BMVRT RMVRT BDTCT RDTCT
Subroutine Function	Initializes Blue and Red force types and tactics and defense posture.	Loads arrays containing visibility factors by weapon categories. Loads corridor widths of forces by weapon categories. Loads distance between force and force weapon categories.	Loads array containing probability of kill for Blue and Red weapons. Loads Blue and Red weapon characteristics.	Loads arrays containing Red and Blue movement rates and detection times.
Subroutines Called	LRDT	TERIN	PKIN	MOVIN
Functional Area	Load Low Resolution Data	Load High Resolution Data	Load Weapon Attributes	

\*Currently not used

Table 3-1. (continued)

•

No. 6 STATE

Primary Variable Description	Defending force index Blue defending/attacking index Red defending/attacking index Number of Blue dismounted infantry allowed in carrier	Number of Red dismounted infantry allowed in carrier	Blue dismount index Red dismount index	Blue overwatch index	Red overwatch index Blue withdrawal index	Red withdrawal index	Minute counter for DIAM battle	Minute counter for withdrawal	Minute counter for final protective fires	Blue disengage index	Red disengage index	Minefield characteristic array	Blue false fire factor	Red false fire factor	Blue holding position index	Red holding position index	Array to be initialized	Value initialized for array
Primary Variables	DFRC BOFAT RDFAT BOMNUM	RDMNUM	BDMV RDMV	BOVWTH	ROVWTH BWDRW	RWDRW	KNTMNT	KWDWNT	FPFTM	BDSNG	RDSNG	AMFLD	BFLSFR	RFLSFR	BHOLDS	RHOLDS	ARRAY	VAR
Subroutine Function	Initializes counters, flags, and variables used in attrition loop.																Initializes any 10x2 array.	
Subroutines Called	INDX1						INDX2										INITI	•
Functional Area	Initialize Arrays and Variables			_		·×												

Table 3-1. (continued)

Primary Variable Description	Ammunition loads for Blue weapon types	Ammunition loads for Red weapon types	Blue artillery loss array from Jiffy Red artillery loss array from Jiffy	Distance from Blue force centrold to Blue weapon types	Minefield characteristic array Minefield loss rates Location of front edge of minefield Location of rear edge of minefield	Percent of Blue weapon categories visible to Red weapon categories Percent of Red weapon categories visible to Blue weapon categories	Blue ratio of dismounted infantry to troop carriers Red ratio of dismounted infantry to troop carriers	Red dismount index Number of Red troops mounted per carrier Blue dismount index Number of Blue troops mounted per carrier
Primary Variables	вамо	RAMO	BART JF RART JF	DBFBWP	AMFLO AMLSR FMNFD BMNFD	e PCBVRC PCRVBC	BDMRT0 RDMRT0	RDMV RNUMDM BDMV BNUMDM
Subroutine Function	Initializes ammunition loads for Blue weapons.	Initializes ammunition loads for Red weapons.	Initializes artillery losses from Jiffy.	Initializes distances from force centroid to force weapon types.	Initializes defending minefield parameters and loss rates.	Chooses two of the six available PCBVRC visibility tables based on force engagement or withdrawal. PCRVBC	Calculates ratio of dismounted troops to troop carriers.	Mounts dismounted infantry into troop carriers.
Subroutines Called	BSETLO	RSETLD	INTART	INTOST	MINCHR	PCTBL	DMRTO	REMNT
Functional	Initialize	000 T			2 7			

Primary Variable Description	Distance from Blue weapon types to Red weapon types Distance from Red weapon types to Blue weapon types Minimum distance between Red and Blue weapon types	Range band from Blue weapon type to Red weapon type Range band from Red weapon type to Blue weapon type	Percent of Blue weapon types visible to Red weapon types Percent of Red weapon types visible to Blue weapon types	SSPK for Blue firers vs Red target types SSPK for Red firers vs Blue target types	Total number of Red engageable target types Total number of Blue engageable target types	Blue time to engage Red target types Red time to engage Blue target types	Number of Blue rounds to kill Red targets types Number of Red rounds to kill Blue target types	Blue time to kill Red target types Red time to kill Blue target types
Primary Variables	DBWRWP DRWBWP DSTMIN	BRRGBD RBRGBD	PCBVRZ PCRVBZ	BRPKW RBPKW	TOTRTG TOTBTG	BTMENG RTMENG	BROKLL	BTMKLL RTMKLL
Subroutine Function	Determines distance from Blue weapon types to Red weapon types.	Determines range bands from Blue weapon types to Red weapon types.	Determines fraction of Red and Blue weapon types visible to Blue and Red weapon types.	Determines SSPK for Blue vs Red and Red vs Blue weapon types.	Calculates total number of Red and Blue engageable target types.	Determines time to engage Red and Blue target types.	Calculates rounds to kill Red and Blue target types.	Calculates time to kill Blue and Red target types.
Subroutines	WPNDST	RNGBND	PCWPVS	РКМР	NUMTGT	TIMENG	RNDKLL	TMKLL
Functional	Begin Attrition Loop				Calculation of Rounds	0 0 -		

	Frimary Variable Description	Rounds fired by Blue weapon types Rounds fired by Red weapon types	Rounds fired by Blue weapon types Ammunition loads of Blue weapon types Sum of rounds of Blue weapon types Rounds fired by Red weapon types Ammunition loads of Red weapon types Sum of rounds of Red weapon types	Expected committee losses of Blue weapon types Expected committee losses of Red weapon types	Total expected losses of Blue weapon types Total expected losses of Red weapon types	Artillery losses for Blue weapon types Artillery losses for Red weapon types	Mine losses for Blue weapon types Mine losses for Red weapon types	See above	Total Blue weapon type losses Total Red weapon type losses	Blue killer/Red victim weapon type loss table Red killer/Blue victim weapon type loss table
(continued)	Primary Variables	BRDFR RRDFR	BRDFR BAMO BRDSUM RRDFR RAMO RRDSUM	EBCLSS ERCLSS	EBTLSS ERTLSS	BARTLS RARTLS	BMNLSS RMNLSS	EBTLSS ERTLSS BARTLS RARTLS BMNLSS RMNLSS	BDEAD RDEAD	BRKVLS RBKVLS
Table 3-1. (co	Subroutine Function	Calculates projected Blue and Red rounds fired.	Calculates actual rounds fired based on remaining ammunition loads.	Calculates expected Blue and Red committee losses.	Calculates total expected Blue and Red losses	Calculates artillery losses for Red and Blue weapon types.	Calculates mine losses for Blue and Red weapon types.	Calculates Red and Blue dismounted losses.	Cumulates total Red and Blue weapon type losses.	Calculates killer/victim scoreboard for Red and Blue weapon types for Jiffy gamers.
	Subroutines Called	RNDFRD	RNDCK	ECLOSS	ETLOSS	ARTLSS	MNLSS	DMSLSS	TALLY	JFLSS
	Functional Area	Calculation of Rounds	(alico) paul	Calculation of Total Losses						

# Table 3-1. (continued)

Primary Variable Description	Blue force dismount index Red force dismount index	Blue force overwatch index Red force overwatch index	Blue force disengage index Red force disengage index	Blue force withdrawal index Blue hold position index	Red force withdrawal index Red hold position index	Blue weapon type movement rate Red weapon type movement rate	Distance between Blue force centroid and Blue weapon types Distance between Red force centroid and Red weapon types
Primary Variables	BDMV RDMV	BOVWTH ROVWTH	BDSNG RDSNG	BWDRW BHOLDS	RWDRW RHOLDS	BWPMVR RWPMVR	DBF BWP ORF RWP
Subroutine Function	Determines if attacking force dismounts.	Determines if attacking force goes into overwatch status.	Displays report to gamers. Includes killer/victim score- board, minimum distance between forces, and asks gamer to continue or withdraw forces.	Determines if Blue force disengages based on attrition losses. If Blue force is to disengage, then subroutines PCTBL, DMRTO, REMNT are called (See Initialize Attrition Loop functional area).	Determines if Red force disengages based on attrition losses. If Red force is to disengage, then subroutines PCTBL, DMRTO, REMNT are called. (See Initialize Attrition Loop functional area).	Determines movement rates for Red and Blue weapon types.	Calculates new distances between a force and its weapon types.
Subroutines Called	TACDSM	TACOVW	REPRT	DSNG	DSNG	MVRT	NDIST
Functional Area	Determination TACDSM of New	ומכרוכא		Determination of Blue Force Disengagement	Determination DSNG of Red Force Disengagement	Determination MVRT of Movement	rates and Positions

Table 3-1. (concluded)

Subroutines Called ARTSP SPDG	Primary Variable Description	Blue weapon type artillery losses used only for suppression calculation Red weapon type artillery losses used only for suppression calculation	Blue weapon type fire suppression degradation Red weapon type fire suppression degradation Blue weapon type movement suppression degradation Red weapon type movement suppression degradation	Minute counter for withdrawal Minute counter for engagement
Subroutines Called ARTSP SPDG	Primary Variables	BART SP RART SP	BSPF DG RSPF DG BSPMDG RSPMDG	KNTMNT
	Subroutine Function	Calculates Blue and Red artillery losses for suppression only.	Calculates Blue and Red fire and movement suppression degradation factors.	This procedure checks and adds minute counters and returns control to Jiffy after a force has withdrawn 10 minutes (See Determination of New Tactics Functional Area).
onal ation ation ssion Run	Subroutines Called	ARTSP .	SPDG	REPRT
Functic Area Calcula of Fire Movemen Suppres Check	Functional Area	Calculation of Fire and Movement Suppression		Check for End of Module Run

- a. The main program is sectioned into functional areas or procedures and, with comment statements, is self-explanatory. The main program's primary function is to call subroutines. Each subroutine begins with a brief description of the purpose. When a subroutine is called from the main program, the parameters in the calling statement are listed so that returning variables are at the end of the argument list. All parameters are explained in the subroutine called.
- b. The following variable name convention was adopted for single and dual purpose subroutines. Single purpose subroutines are those that receive only one set of parameters from the call statements of the main program. For single purpose subroutines, the parameters match the calling parameters of the main program. Dual purpose subroutines are those that receive two sets of parameters from the main program. In the first case, the set of parameters will be Blue force variables that contain Blue force information in relation to Red. In the second case, the set of parameters will be Red force variables that contain Red force information in relation to Blue. To represent both cases the variable name convention in the subroutines results in "X" force variables that contain "X" force information in relation to "Y" force information.
- c. Figures 3-2 and 3-3 show subroutines INDX2 and RNDKLL, a single purpose subroutine and a dual purpose subroutine, respectively, being called from the main program. The dual purpose subroutine RNDKLL is called twice, once to determine Blue rounds to kill Red targets and again to determine Red rounds to kill Blue targets. The first time the main program passes Blue and Red arrays to interpret "X" force for Blue force and "Y" force for Red force variables. The second time the main program passes Blue and Red arrays to interpret "X" force for Red force and "Y" force for Blue force variables.
- d. A knowledge of the tactics currently played in DIAM is required to understand most variable names and array variables. All weapons played in DIAM are categorized in one of four groups: dismounted infantry, mortars, light armor, and heavy armor. Two tactical modes are played by the weapons: mounted/dismounted for troops and carriers, and heavy armor in overwatch. Table 3-2 shows the tactical modes for weapons in each weapon category.

```
C
    INITIALIZE ARRAYS AND VARIABLES
C
C
      DETERMINE INDEXES FOR BLUE AND RED FORCES
        CALL INDXI (DFFC, BDFAT, RDFAT, BFRCTP, BDMMAX, RDMMAX,
     1
          BWDRW, RWDRW, BDHV, RDMV, BOVWTH, ROVWTH)
        CALL INDX24KNTMNT, KWDMNT, FPFTM, BDSNG, RDSNG, AMFLD,
          BOFAT, BFISFR, RFLSFR, BHOLDS, RHOLDS)
C
C
C
      SUBPOUTINE INDX2(KNIHNT, KWDMNI, FPFIM, BDSNG, RDSNG, AMFLO,
                        BDFAT, BFL SFR, RFL SFR, 6HOLDS, RHOLDS 1
C
C
      THIS SUBROUTINE INITIALIZES THE FOLLOWING VARIABLES AND
C
        INDEXES
C
C
      KATHNT
                  MINUTE COUNTER FOR DIAM BATTLE
C
      KWDMNT
                  MINUTE COUNTER DURING WITHDRAWAL IN DIAM
C
      FPFIM
                  MINUTE COUNTER FOR FINAL PROTECTIVE FIRES
C
      BUSNG
                  INDEX FOR X FORCE:
                                       1=ENGAGING. ? =DISENGAGING
C
      RUSNG
                  INDEX FOR Y FORCE:
                                       1=ENGAGING, 2=DISENGAGING
C
      AMPLD (1)
                  INDEX FOR MINES IN USE: 0=NO, 1=YES
C
                  HINEFIELD WIDTH
      AMPLD (2.)
C
                  MINEFIELD FRACTION NOT BYPASSED
      AMFLD 13 1
ſ,
                  FRACTION OF ATTACKING FORCE ENTERING MINEFIELD
      AMFLD 14 1
C
                  FALSE FIRING FACTOR FOR BLUE FORCE
      BFLSFR
C
      RFLSFR
                  FALSE FIRING FACTOR FOR RED FORCE
C
                  INDEX FOR BLUE FORCE: 1=DEFENDING, 2=ATTACKING
      BDFAT
C
                  INDEX FOR BLUE FORCE: 1=BLUE FORCE HOLDS POSITION.
      BHOLDS
C
                  2-BLUE IS ALLOWED TO WITHDRAW
C
      RHOLDS
                  INDEX FOR RED FORCE: 1=RED FORCE HOLDS POSITION.
C
                  2=RED IS ALLOWED TO WITHDRAW
      DIMENSION AMPLD 441
C
      INITIALIZE VARIABLES:
        KNTMN T=1
        K WOMN T= O
        FPF TM = C
        BDSNG=1
        RDS NG = 1
        BHOLD S= 2
        RHOLDS=2
(
        00 10 1=1.4
          AMPLDII) = 0
10
         CONTINUE
C
      IF (BDFAI.EQ.1) THEN
        BFLSFR = D.8
         RFLSFR : 0.4
      ELSE
         BFLSFR = 0.4
        FFLSFR - 0.8
      E'D IF
C
      RETURN
        EAD
```

Figure 3-2. Single purpose subroutine

```
C
        FOR BLUE MEAPON TYPES
        CALL RNDKEL #8FPKW BRDKLL }
C
C
      CALCULATE ROUNDS TO KILL BLUE TARGET TYPES
C
        FOR RED WEAPON TYPES
        CALL RNOHLL TRBPAH, RROHLL )
C
C
È
      SUBROUTINE RNOKELIXYPHW JRDKLLI
C
      THIS SUBROUTINE CALCULATES ARDREL (I.M.J). ROUNDS TO KILL
C
        FOR X FORCE REAPON TYPE I IN TACTICAL MODE J=1.2
        AGAINST Y FORCE TARGET TYPES M OF WHICH M=11.20
C
C
        ARE IN TACT, CAL MODE 2
C
C
                      PROBABILITY OF KILL ISSPKI FOR X FORCE
      XYPKWII "HEJ!
Č
                      WEAPON TYPES I IN TACTICAL MODE J=1.2
·C
                      AGAINST Y FORCE TARGET TYPE M. OF
C
                      WHICH MILL 2C ARE IN TACTICAL HODE 2
C
C
      DIMENSION XYPAU 410, 20, 21, XRDKLL (10, 20, 21
C
C
100
      DO 10 J=1 .2
        00 20 1:1,16
          DO 30 1:1,2
            DO 40 H-1.16
C
              L.OI & II-II+N. I SURGERIA
              IF IPALGIOUS THEN
                RUKEL TIJPH
              ELSE
                ROKEL -D
              Et D 15
              ##DKL( $1, K > (L - 1 8 * 10, J) = RDKLL
C
40
            CONTINUE
30
          CONTINUE
20
        CONTINUE
10
      CONTINUE
C
      RETURN
      DEBUG SUBCHA
      AT 100
      END
```

CALCULATE ROUNDS TO KILL RED TARGET TYPES

Figure 3-3. Dual purpose subroutine

Table 3-2. Tactical modes for each weapon category

Weapon Category	Tactical Mode (1)	Tactical Mode (2)
Dismounted Infantry	Mounted in troop carriers	Not in troop carriers
Light/Troop Carriers	Troop carriers mounted	Troop carriers dis- mounted
Light/Non-Troop Carriers	(Engaging)	-999 as non-troop carrier flag
Heavy	Not in overwatch	In overwatch
Mortars	(Engaging)	N/A

3-5. DIAM CODE. This section contains the DIAM code interfaced with Jiffy. Some features of this DIAM version are unique to Jiffy. For example, most of the low resolution data or gamer input for DIAM is implemented by the subroutine Jiffy before DIAM is called by INFANT. Blue and Red weapons from the Jiffy element array are chosen. The arrays IBNFID and IRDFID contain the Jiffy weapon pointers, a mounted or dismounted flag, a non-carrier flag, and a secondary weapon flag for each of the weapon types chosen. Artillery losses from Jiffy are added back to the weapons played in DIAM. Then DIAM reapportions the artillery losses each minute of battle. The DIAM code as shown has been tested and is currently being used to support war game studies with good results.

```
DIAMPUBLISH.DIAMMAIN
R1
      U4/01/82-10:33(0<sub>9</sub>)
                                                               ************
                                       SUBROUTINE DIAMMAIN
   100.
           C ****************
   110.
   125.
           C
   130.
           C
                  SUBROUTINE DIAM GREKVLS, BRKVLS, SHOTSI, IRPTH, IBAT, K25, K15, K2C,
   140.
                                     H27 : 1 OBS : TRNTP : DFRC : AFRC : BWPN : RWPN : BART JF :
   150.
                 1
                 1
                                     RARIJE, ARPAM, BN UM, RNUM, IBU, IRD, IBNF IU,
   160.
                                     IRNFID, IU, OSTBRI
   170.
                 1
   186.
           C
   190.
           C
                   COMMONAREE DA WOA VI ANIMA (4), ICARD (20), IHV, IHN, IHB, IHYES, IHNO
   200.
           C
   210.
   22 ".
           C
                   DIMENSION BEPNEID, 3), REPNEID, 3), DGMATT(4, 2), BARTJF (10, 4)
   230.
                 1. HARTUF 13 0 of 1. ARPAMEB 1. AMF LD141. AMLSR (41. AMDTH 14.5)
   240.
                 2.8WOTH(4,5).RWDTH(4,5).SHOTSI(10,2).PREP(2).IBU(1C)
   250.
                 3, IRD 410 1, BAHO ( 10, 21, KAHO ( 10, 21, IBNFID ( 25, 4 ), IRNFID ( 25, 4 )
   260.
    270.
           C
                 2 .PCRVBE (4 .4 .5 ) . PCRVBb (4 . 4 . 5 ) .PCRWB (4 .4 .5 ) .PCBVRE (4 .4 .5 )
   280.
                 3.PCBVR444,4.53,PCBHVR44,4,51,DFCHC14,21
   290.
    300.
           €
                 4.BRPK(10.10.51.RBPK(10.10.51.BCHR(10.51.RCHR(10.5)
    310.
                 5 . BMYR f 4 4 . 2 3 . R MY R 7 4 4 . 2 1 . BDTC T 4 4 4 4 5 1 . RDTC T 4 4 4 5 1 . T A CA (2 . 3 1
    32C.
            C
    33 C.
                 6, BDEAD(10, 23, RDEAD(10, 21, BSPFDG(10, 21, RSPFDG(10, 2)
    340.
                 7.85PM06(10.2) RSPND6(20.2), BMNLSS(10.2), RMNLSS(10.2)
    35C.
                 8.BRDSUM(10,21,RRDSUM(10,2)
    36C.
    370.
            C
                 9. UBF8UP $ 10.21. ORFRHP (10.21, PCBVRC(4,4,5), PCRVBC(4,4,5)
    380.
    391.
            C
                  1.0BWRWP (10.20,2), BRRGBD(10.20,2), RBRGBD(10.20,2)
    400.
                  2 .PCBVKZ (1C .20, 2 1, PCRVBZ (10, 20, 21, BRPK w (10, 20, 2)
    41C.
                  3, REPRESIO, 20, 21, ORUBEP(10, 20, 2)
    47 C.
            C
    4311.
                  4. TOTR [G | 1C , 21, TOTBT 6 | 10, 21
    440.
                  5.BIMENG !10,20,21,RIMENG 110,20,21,BRDK.L. (10,20,2)
    45C.
                  6, KROKLL 110, 20, 21, BYMKLL (10, 20, 21, RTMKLL (10, 20, 2)
    46 C.
                  7,BRDFR(10,20,21,RRDFR(10,20,2)
    470.
            C
    486.
                  8,EBCLSS {10,20,21,ERCLSS(10,20,2),ERTLSS(10,2),EBTLSS(10,2)
    49 D.
                  9.BWPMVR(11,21,RWPMVR(10,21,BARTLS(10,21,RARTLS(10,21
    5CO.
                  1.PARTSP(10.21, RARTSP(10.21, BRKVLS(12.131, RBKVLS(12.131
    51!
    Sto.
            C
    570.
            C
    586.
            C
            C
                 LOAD LOW RESOLUTION DATA
    591.
    600.
            C
                   INITIALIZE THE REST OF LOW RESOLUTION DATA
            C
    611.
                     CALL LEGISBERGIP, RERCTP, DPSTR, TACAL
    620.
            1
    63C.
            C
    64 C.
            C
    f5' .
            C
                 LOAD HIGH RESOLUTION DATA
    660.
            C
    670.
            C
                   LOAD PERCENT VISIBLE TABLES, DISTANCES, AND CORRIDOR WIDTHS
    685.
            C
                     CALL TER IN TIEAT, K25, PCRVBE, PCRVBW, PCRWVB, PCBVRE, PCBVRW,
    69D.
    700.
                        PCBUUR OUFCEC ANDTH BADTH REDTH OGHATTI
    731.
            C
    720.
            C
```

```
SIFIED
   730.
           C
   74 .
           C
               LOAD WEAPON ATTRIBUTES
   75 .
           €
   76 C.
                 LOAD PROBABILITY OF KILL AND WEAPON CHARACTERISTICS TABLES
   775.
                    NUMB = BNUM
   780.
                    NUMR = RNUM
                    CALL PKINIBRPK, RBPK, BCHR, RCHR, IBU, IRD, K15, K16, NUMP, NUMR,
   790.
   50C.
                      101
   .318
           C
                 LOAD BLUE AND RED MOVEMENT RATES AND DETECTION DATA
   82 ".
           C
   830.
                    ITENTP = TENTP
                    CALL MOVINGIOS, ITRNTP: K27, K20, BMVRT, RMVRT, BDTCT, RDTCT)
   841.
           C
   851.
           C
   86 .
   871.
           C
   .188
           C
               INITIALIZE ARRAYS AND VARIABLES
   89 ,
           C
   9:0.
           C
                 DETERMINE INDEXES FOR BLUE AND RED FORCES
                    CALL INDX1 (DFRC .BDFAT .RDFAT .BFRCTP .BDMMAX .RDMMAX .
   910.
                      BUDRY, RWDRW, BDMY, RDMY, BOYWTH, ROVWTHI
   920.
                    CALL INDX2 (KN THNT, KWD MNT, FPFTM, BDSNG, RDSNG, AHFLD,
   937.
                      BOFAT, BFLSFR, RFLSFR, BHOLDS, RHOLDS 1
   941.
   55 C.
           (
   YEC.
                  VAR =0.0
   57 .
                    ZERO-OUT CUMULATIVE KILLS FOR BLUE WEAPON TYPES
           C
   980.
                      CALL INITI (BDEAD, VAR)
   991.
           C
                    ZERO-OUT CUMULATIVE KILLS FOR RED NEAPON TYPES
  1.00.
           C
  1010.
                      CALL INITIARDEAD, VARI
  102C.
           Ĺ
                    7ERO-OUT BLUE ARTILLERY LOSSES
  111(.
           C
  1120.
                      CALL INITI (BARTLS, VAR)
  1130.
           (
  1147.
                    ZERO-OUT RED ARTILLERY LOSSES
           C
  115 .
                      CALL INITITEARTLS, VARI
  1160.
           С
                    JERO-OUT BLUE ROUNDS FIRED SUMMATION
  1170
  1180.
                      CALL INITI (BRDSUM, VAR)
           C
  11'6.
                    VERO-OUT RED ROUNDS FIRED SUMMATION
  12 .0.
           C
  1210.
                      CALL INITIARRDSUM, VARI
  172 .
           C
  1236.
                  VAR = 0.5
  1240.
                    ZERO-OUT BLUE SUPPRESSION FIRE DEGRADATION
           C
  1250.
                      CALL INIT1 (BSPFDG .VAR)
  126 .
           C
  127" "
           C
                    ZERO-OUT RED SUPPRESSION FIRE DEGRADATION
                      CALL INITIORSPEDG, VARI
  1280.
           C
  1250.
                  VAR =C.D
  1300.
                    ZERO-OUT BLUE SUPPRESSION MOVEMENT DEGRADATION
  131'.
           C
  1 32 C.
                      CALL INITI (BSPMDG, VAR)
  1 1100
           C
                    ZERO-OUT RED SUPPRESSION MOVEMENT DEGRADATION
  134 .
           t
                      CALL INITITRSPMDG, VARI
  1356.
           C
  13:0.
  1470.
           ſ
  141 .
           C
  142' .
           C
                INITIALIZE ATTRITION LOOP
  1430.
           C
                  INITIALIZE AMMUNITION LOADS FOR BLUE WEAPONS
  1446.
           C
                                              3 - 17
```

SIFIEC

```
BSLD=1.C
1450.
                  BSL DR = 1.0
1460.
                  CALL BSETLD &B NUM & IBU , B SLD , B SLDR , B CHR , IBN FID , BAMO )
1470.
1490.
         C
                INITIALIZE AMMUNITION LOADS FOR RED WEAPONS
1500.
                  CALL RSETLD (R NUM, IRD, BSLD, BSLDR, RCHR, IRNFID, RAMO)
1510.
1530.
         C
                INITIALIZE ARTILLERY LOSSES FROM JIFFY
1540.
                  CALL INTARTIARPAM, BARTJF, RARTJF?
1550.
         C
1560.
                INITIALIZE DISTANCE FROM BLUE FORCE CENTROID
1570.
         C
1580.
         C
                  TO BLUE WEAPON TYPES
1590.
                  IFRC=1
1600.
                  CALL INTDST(IFRC, BCHR, BWPN, DFCWC, DBFBWP)
1610.
         C
                INITIALIZE DISTANCE FROM RED FORCE CENTROID
162 0.
         C
1630.
         £
                  TO RED WEAPON TYPES
1640.
                  IFRC=2
                  CALL INTOSTITERC, RCHR, RWPN, DF CWC, DRFRWP1
1658.
1660.
                DETERMINE MINEFIELD CHARACTERISTICS
1671.
         C
                  CALL MINCHRIAMFLD.FMNFLD.BMNFLD.DFCWC.DFRC.AHLSRI
1680.
1690.
1700.
         C
                DETERMINE THE VISIBLITY TABLES TO USE IN LOOP
1710.
                  CALL PCTBL 1BHDRW, RWDRW,DFRC,PCRVBE,PCRVBW,PCRWVB,
                    PCB VRE .PCB VRW. PCB WVR. PCRVBC .PCB VRC )
1720.
               1
1730.
         C
174°.
         C
                DETERMINE NUMBER OF TROOPS TO MOUNT FOR ATTACKING FORCE
                  IFIBDFAT.EQ. 2 . AND. BDNV.EQ. 21 THEN
1750.
                    CALL DARTO (BCHR, BWPN, BDARTO)
1760.
1 77 C.
                    CALL RENNT (BCHR, BUPN, BDMMAX, BDMV, BDMRTO, BNUMDH,
1781.
1790.
                  ELSE IF IRDFAT.EQ. 2 .AND. RDMV.EQ. 21 THEN
                    CALL DARTO (RCHR. RWPN. RDMRTO)
1800.
1810.
                    CALL RENNTERCHRERVPNERDMMAXERDMVERDMRTOERNUMDM.
                      DRFRUPI
1 82 C.
                  ELSE
1835.
184 C.
                  END IF
 185 (.
         C
1890.
         C
 1900.
         C
         C
             BEGIN ATTRITION LOOP
 1910.
 1920.
         C
 1930.
                DETERMINE DISTANCE FROM BLUE WEAPON TYPES
         C
                  10 RED HEAPON TYPES
 1940.
         C
                  CALL WPNDSTIDSFBWP,DRFRWP,DSTBR,BWPN,RWPN,DBWRWP,DSTMIN)
 1950.
         10
 1960.
         C
 1971.
         C
                DETERMINE RANGE BANDS FOR BLUE WEAPON TYPES
 1980.
                  TO RED NEAPON TYPES
         C
 1991.
                  CALL RNGBNDIDBHRWP, BRRGBDI
         C
 2000.
                DETERMINE DISTANCE AND RANGE BANDS FOR RED WEAPON
 2(10.
         C
 2020.
         C
                  TYPES TO BLUE WEAPON TYPES
 2030.
                  CALL RNGDSTIBERGBD, RBRGBD, DBWRWP, DRWBWP)
 2040.
         C
 2050.
         C
                DETERMINE FRACTION OF BLUE WEAPON TYPES VISIBLE
 2060.
         C
                  TO PED WEAPON TYPES
 2070.
                  CALL PCWPVSIBCHR.RCHR.PCBVRC.BRRGBO.PCBVRZ1
 2080.
         C
 2590.
         C
                DETERMINE FRACTION OF RED LEAPON TYPES VISIBLE
         C
                  TO BLUE WEAPON TYPES
 2100.
```

```
2110.
                 CALL PCWPVSIRCHR, BCHR, PCRVBC, RBRGBD, PCRVB23
2120.
         C
2131 -
        С
               ULTERMINE SINGLE SHOT PROBABILITY OF AILL
2147
        C
                 FOR BLUE WEAPONS AGAINST RED TARGETS
2150.
                 CALL PKWP (BRPK, BRRGBD, BRPKW)
        C
2160.
               DETERMINE SINGLE SHOT PROBABILITY OF WILL
217'.
        C
        C
218C.
                 FOR RED WEAPONS AGAINST BLUE TARGETS
2190.
                 CALL PHAP (RBPK.RBRGED.RBPKW)
2230.
        C
2240.
        C
22: · ·
        C
226'.
        C
             CALCULATION OF ROUNDS FIRED BY WEAPON TYPE
2270.
        €
228 .
        C
               CALCULATE TOTAL NUMBER OF ENGAGABLE RED TARGET TYPES
        C
                 FOR BLUE WEAPON TYPES
2290.
23'0.
                 CALL INITIATOTRIG. VARI
2310.
                 CALL NUMIGITABRPHW, AMPN, PCRVB2, RSPFDG, TOTRIGI
2 '20.
        C
233".
        C
               CALCULATE TOTAL NUMBER OF ENGAGABLE BLUE TARGET TYPES
234 .
        C
                 FOR RED WEAPON TYPES
235 %
                 CALL INSTITUTOTETG. VARI
236C.
                 CALL NUMIGITARBPKW, BWPN, PCBVR2, 95PFDG, TOTATG)
2370.
        C
238 .
        C
               LALCULATE TIME TO ENGAGE ALL RED TARGET TYPES
2390.
        C
                 FOR BLUE WEAPON TYPES
2400.
                 CALL TIMENGEBOUNTH, ERPHN, BRRGBD, BCHR, RCHR, BDFAT,
241C.
                   BOTCI .BIMENGI
24.6.
        C
243 .
        C
               CALCULATE TIME TO ENGAGE ALL BLUE TARGET TYPES
244C.
        C
                 FOR REU LEAPON TYPES
245%
                 CALL TIPENGIR OVWTH, RBPKW, RBRGBD, RCHR, BCHR, RDFAT,
2466.
                   RDTCT, RTMENG)
2470.
        (
2481.
        C
               CALCULATE ROUNDS TO KILL RED TARGET TYPES
249 .
        C
                 FOR BLUE WEAPON TYPES
55.C.
                 CALL RNDKLEIBRPKW.BRDKLLI
2!1 .
        C
252 . .
        C
               CALCULATE ROUNDS TO KILL BLUE TARGET TYPES
253C.
        Ĺ
                 FOR REU LEAPON TYPES
2:4 .
                 CALL FROMLLIRBPHW. FROMLLI
2551.
        (
        C
               CALCULATE TIME TO KILL RED TARGET TYPES
256 .
257C.
        C
                 FOR BLUE WEAPON TYPES
258'.
                 CALL THELL IBTHENG, BCHR, BROKLL, BREGBU, BTHKLL)
2590.
        C
2 £ "C.
        C
               CALCULATE TIME TO KILL BLUE TARGET TYPES
2610.
        C
                 FOR REU WEAPON TYPES
262 :.
                 CALL INKLLIRIMENG, ACHR, ARDKLL, ABRGBD, RIMKLLI
2 £ 3 C .
        (
264 .
        C
               CALCULATE PROJECTED HOUNDS TO FIRE BY BLUE WEAPONS
                 AGAINST RED TARGET TYPES
265C.
        C
216".
                 CALL RNDFRD (BIMKLL, TOTRIG BUPN, RUPN, PCBVRZ, PCRVBZ,
2670.
                   BOFAT, BWDRW, BRDKLL, BSPFDG, RSPFDG, BRDFRI
2681.
        (
        C
               CALCULATE PROJECTED ROUNUS TO FIRE BY RED WEAPONS
2710.
271C.
        C
                 AGAINS! BLUE TARGET TYPES
2 72 . .
                 CALL ENDFROIRIMKLE, TOTSTG, RWPN, BWPN, PCRVBZ, PCBVRZ,
2731.
                   RDFAT, RWDRW, RRDKLL, RSPFDG, BSPFDG, RRDFR1
2757.
        C
               CALCULATE ACTUAL ROUNDS FIRED BY BLUE WEAPONS
2760.
        C
```

```
2770.
                 CALL RNDCK IBWPN.BCHR.RCHR.BNUM.RNUM.BRDFR.BAMO.BRDSUMJ
281 %
        C
               CALCULATE ACTUAL ROUNDS FIRED BY RED WEAPONS
        C
282 %
                 CALL RNDCK (RMPN, RCHR, BCHR, RNUM, BNUM, RRDFR, RAMO, RRDS UM)
2830.
        C
2890.
2900.
        C
2910.
        C
             CALCULATION OF TOTAL LUSSES
292 €.
        C
2931.
        C
2940.
               CALCULATE EXPECTED BLUE COMMITTEE LOSSES
        C
                 CALL ECLOSSIRBPKW.BWPN.PCBVRZ.RRDFR.RFLSFR.BSPFUG, EECLSS)
295C.
2960.
        С
               CALCULATE EXPECTED RED COMMITTEE LOSSES
        C
2970.
                 CALL ECLOSSIPRPKW.RWPN.PCRVBZ.BRDFR.BFLSFR.RSPFD6.ERCLSSI
2980.
        C
2590.
               CALCULATE TOTAL EXPECTED DIRECT FIRE BLUE LOSSES
3000.
        C
3010.
                 CALL ETLOSSIBWPN.EECLSS.EBTLSSI
3 12 0 .
        C
               CALCULATE TOTAL EXPECTED DIRECT FIRE HED LOSSES
        C
3030.
3040.
                 CALL ETLOSSIRWPN, ENCLSS, ERTLSS)
3050.
        C
               CALCULATE BLUE ARTILLERY LOSSES
         C
3 160.
3076.
                 CALL ARTLSSIKNIMNI, ARPAM, BARTUF, BUPN, BCHR, BARTLSI
         C
3080.
3 '90.
               CALCULATE RED ARTILLERY LOSSES
        C
3100.
                 CALL ARTLSS (KNTHNT, ARPAM, RARTJF, RUPN, RCHR, RARTLS)
         C
3110.
               CALCULATE ATTACKER MINE LOSSES
         C
312 .
                  IF ABDFAT. EQ. 21 THEN
3131.
3140.
                    CALL MNLSSIAHFLD, AMLSR, AND TH, DSTBR, FMNFLD, BMNFLD,
                      BCHR, BWPN, OBFBWP, BMNLSS 1
3150.
              1
316 .
                  ELSE
                    CALL HNLSS !AMFLD, AMLSR, ANDTH, DSTBR, FMNFLD, BMNFLD,
3171 .
              1
                      R CHR , RUPN , DRFRUP, RMNL SS J
3180.
                  END IF
3190.
321.00
         C
         C
               CALCULATE MOUNTED INFANTRY LOSSES
321' .
3221.
                  IFIBDMV.EQ.II THEN
                    CALL DINLES IBNUMDH. BHPN . BCHR. EBTLSS )
3230.
                    CALL DSMLSS IBNUMDH, BWPN, BCHR, BARTLS )
3240.
3251.
                    CALL DIMLSS (BNUMDH, BHPN, BCHR, BMNLSS)
3260.
                  E YU IF
                 IFIRDMV.EQ.11 THEN
3270.
                    CALL DSHLSS IRNUMDM, RWPN, RCHR, ERTLSS I
3280.
3290.
                    CALL DIMESS IR NUMBH, RUPH, RCHR, RARTES I
                    CALL DINESS IRNUMBH, RHPN , RCHR, RMNLSS 1
3360.
331: .
                  END IF
332(.
         C
               CUMULATE TOTAL LOSSES FOR BLUE WEAPON TYPES
3330.
334C.
                  CALL TALLY IBHPN, EBILSS, BARTLS, 6MNLSS, BDEAD)
33!0.
         C
3360.
         C
               CUMULATE TOTAL LOSSES FOR RED WEAPON TYPES
3770.
                 CALL TALLY TRUPH, ERTLSS, RARTLS, RMNLSS, RDEAD)
         C
3330.
339 .
         C
               CALCULATE BLUE TO RED KILLER VICTIM SCOREBOARD
3400.
                  CALL JFLSSIRCHR.RHPN.ERCLSSGERTLSSGRARTLSGRMNLSSGPHKVLSI
341C.
         C
342 %
         C
               LALCULATE RED TO BLUE KILLER VICTIM SCOREBOARD
3437.
                  CALL JFLSS (BCHR, BRPN, EBCLSS, EBTLSS, BARTLS, BMNLSS, PHKYLS)
3 94 0.
         C
         C
3480.
```

```
3490.
         C
350C.
         C
             DETERMINE NEW TACTICS
351C.
         €
352 ".
         C
                DETERMINE NEW TACTICAL MODE FOR BLUE FORCE
353C.
                  IFIBDFA 1.EQ. 2 . AND. BWDRH .EQ. 11 THEN
3540.
                    IFIBDMV.EQ. 11 THER
355C.
                      CALL TACDSMIBDMV.BCHR.RCHR.BWPN.DBFB.P.
356 %
                          DEWRWP , TACAL
              1
357 .
                    END IF
3580.
                    IF IBOVWTH.EQ. 11 THEN
3590.
                      CALL TACOVA 4BOWWTH, BCHR, RCHP, BWPN, DBFBWF,
              1
3:00.
                         CBURWP . TACA )
3611.
                    END IF
362'.
                  END IF
313 .
         C
364 .
        C
               DETERMINE NEW TACTICAL MODE FOR RED FURCE
3650.
                  IF(RDFAT.EG.2 .AND. RWDRW.EQ.1) THEN
                    IFIRDMV.EG. 1) THEN
3160.
367.
                      CALL TACDSMIRDMV, RCHR, BCHR, RWPN, DRFRWP,
366. .
              1
                         DRWBWP . TACA )
364 .
                    END IF
3700.
                    IF (ROVWTH.EG. 1) THEN
3710.
                      CALL TACOVH (ROVETH, RCHR, BCHR, RWPN, DRFRWP,
              1
3720.
                         DRWBUP . TACA )
373' .
                    END IF
374 .
                  E D IF
375 .
         C
3787.
         C
379 .
        C
               DISPLAY REPORT FOR GAMERS
3800.
                  IF ! ! ! KN | MN | / IRP | M | # IRP | M - KN | MN | J . EQ . O | THEN
3810.
                    CALL FEPRT (KNIMNI, RBKVLS, BRKVLS, BNUM, RNUM, BDEAD,
3020 .
                      RDEAD, BWPN, HWPN, BDSNG, RDSNG, BWDRW, RWDRW, BRDSUM,
              1
383~.
              2
                      RRDS UM .DS TMINI
384 .
3 86 .
                  E'D IF
3 27 .
         (
308 .
         (
389".
         (
3900.
        C
             DETERMINE IF ELUE FORCE DISENGAGES
391'.
         (
352 .
        C
               CHECK FOR BLUE DISENGAGEMENT
393'
                  IF (BHUR + . EC. 1 . AND . RWDRW . EQ. 3) THEN
394C.
                    IFRC=3
395 .
                    CALL DSNGIBHOLDS:6DSNG:BWPN:BCHR:BDEAD:1FRC:DGMATT:BWDRW1
356 .
         (
397 .
        C
                    WHEN BLUE WITHDRAWS, THEN INITIALIZE NEW VISIBILITY
3980.
        C
                    TABLES, REMOUNT FORCE, AND RELEASE OVERWATCH STATUS
3556.
                      IF (BUDAN.EQ.2) THEN
4000.
                         PRINT *, BLUE TO WITHDRAW AT ".KNTMNT, " MINUTES"
                         PRINT + . "MINIMUM DISTANCE TO RED FORCE IS " JUSTMIN
4:10.
4020.
                         PRINT *. DO YOU WISH TO WITHDRAW BLUE FORCES?
4130.
                         CALL REEDALIANS)
4 46.
                         IF (IANS . EQ. IHY) THEN
4 45.
                           NUDMNT = KNIMNI
4 50.
                           CALL PCIBLIBHORH, RWDHW, DFRC, PCRVBE, PCRVBW, PCRWVE,
4060.
                             PCB VRE . PCBVRW . FCBWVR . PCRVBC . PCBVRC 1
407C.
                           IF IBDMV.EQ. 21 THEN
4 "8 U.
                             CALL UMRIOIBCHR, BWPN, BDMR TO )
429 .
                             CALL REMNTIBCHR, BUPN, BOMMAX, BOMV, BUMRTO, BNUHDM,
4100.
              1
                               DBFBWPI
411°.
                           ENG IF
```

```
IF (BOVWTH . E.G. 21 THEN
412C.
4139.
                            BOVWTH = 1
414[.
                          END IF
415 C.
                        ELSE
416 .
                          BHOLDS = 1
4170.
                          BudRu = 1
418C.
                          BDSNG = 1
4190.
                        END IF
4250.
                      END IF
                 END IF
421 F.
4221.
        C
4231.
        C
4241.
        C
        C
             DETERMINE IF RED FORCE DISENGAGES
4 26 Fa
427' .
        C
        C
428:
               CHECK FOR RED DISENGAGEMENT
4290.
                 IF (BUDRU.EQ.1 .AND. RUDRU.EQ.1) THEN
430C.
                    1 FR C= 2
                    CALL DSNGIRHOLDS.RDSNG.RWPN.RCHR.RDEAD.IFRC.DGMATT.RWDRW)
431C.
4 32 C.
        C
433 C.
        C
                    WHEN RED WITHDRAWS, THEN INITIALIZE NEW WISIBILITY
4340.
        C
                    TABLES, REMOUNT FORCE, AND RELEASE OVERWATCH STATUS
4350.
                      IFIRWDRW.EQ.21 THEN
                        PRINT +, " RED TO WITHDRAW AT ", KNTKNT, " MINUTES"
436(.
                        PRINT +, " MINIMUM DISTANCE TO BLUE FORCE IS ".DSTMIN
4 37 F.
4 38" .
                        PRINT ". DO YOU WISH TO WITHURAW RED FORCES?"
439C.
                        CALL FEEDATIANS!
                        IF IIANS . EQ. IHYI THEN
4400.
                          NUDANI : KNIMNI
4415.
                          CALL PCTBLIBUORN, RNDRW, DFRC, PCRVBE, PCRVBW, PCRWVB;
44111.
4420.
              1
                             PCB VRE, PCBVRW, PCBWVR, PCRVJC, PCBVRC)
                           IFIRDMY.EQ. 31 THEN
4430.
                             CALL DMR10(RCHR,RWPN,RDMR10)
4441.
4450.
                             CALL RENNTIRCHR.RWPN.RDMMAX.RDMV.LDMRTG.RNUMDM.
446C.
              1
                               DEFRUPI
4470.
                          END IF
                           IF IROUMTH . EQ. 2) THEN
448C.
445 .
                             ROWLTH = 1
                          END IF
4 5C Q.
451 .
                        ELSE
452 .
                          RHOLDS = 1
4530.
                          RUDRU = 1
                          RDSNG = 1
4 54C.
                        E!D IF
4 55 °.
                      END IF
456'.
457 .
                 ENG IF
4586.
         C
4 621.
         C
         C
4630.
        C
4647.
             DETERMINE HOVEMENT RATES AND NEW POSITIONS
        C
4 65 .
        C
               DETERMINE MOVEMENT RATES FOR EACH BLUL WEAPON TYPE
4666.
4670.
                 CALL MURITIBOUWTH, BUFAT, BWDRW, TRNTP, BCHR, BWPN,
4680.
                    BMVRT . BWPMVR1
4691.
         C
471 G.
        C
               CALCULATE NEW DISIANCE FROM BLUE FORCE CENTROID
4716.
        C
                 TO BLUE WEAPON TYPES
4720.
                 CALL NOISTIDSTER, EMPN. BCHR, BWPMVR, BSPMDG, DBF BWP 1
        C
473".
474'.
        C
               DETERMINE MOVEMENT RATES FOR EACH RED WEAPON TYPE
                 CALL MURTIFOUNTH, FDFAT, RWDRW, TENTP, RCHR, RWPN,
4750.
                                          3-22
```

SIFIED

```
SIFIED
  4 76 C.
                       RMVRT.EWPMVR1
              1
  477".
          C
  478".
          C
                 LALCULATE NEW DISTANCE FROM RED FORCE CENTROID
  479C.
          C
                   TO RED LEAPON TYPES
  480C.
                   CALL NDIST (DSTBR, RWPN, RCHR, RWPMVR, RSPHDG, DRERWP)
  493: .
          (
  484 .
          C
  485 .
  486 .
               CALCULATION OF FIRE AND MOVEMENT SUPPRESSION
  4870.
          C
  4881 .
          C
                 CALCULATE BLUE ARTILLERY LOSSES FOR SUPPRESSION
  489C.
                   CALL ARISPIKNIMNI, FPFIM, DBWRWP, BARIJF, ARPAM, BWPN,
  4 SDC.
                     BCHR.BOFAT.BARTSF)
  451 '.
          .c
  452 .
          C
                 CALCULATE FED ARTILLERY LOSSES FOR SUPPRESSION
  4531.
                   CALL ARTSPIKNTHNT, FPFTH, DRUBUP, RARTJF, ARPAM, RUPH,
  4546.
                     PCHR, RDFAT, RARTSP1
  495(.
          C
  4961.
          C
                CALCULATE BLUE FIRE AND MOVEMENT SUPPRESSION DEGRADATION
  4570
                   CALL SPDG IBWORW , R WDRW , BDF AT , B CHR , EBCLSS , ERCLSS .
  4586.
                     BAR TSP , BMNL SS , B SPFDG , B SPMDG )
  459C.
  5000.
          C
                CALCULATE RED FIRE AND MOVEMENT SUPPRESSION DEGRADATION
  5 '1 C.
                   CALL SPDGIBNORW.RWDRW.RDFAT.RCHR.ERLLSS.EBCLSS.
                     RARTSP .RMNLSS . RSPFDG . RSPMDG )
  5020.
  Trec.
          C
  5 70.
          C
  5.60.
          C
              CHECK FOR END OF MODULE RUN
  5190.
          C
  51 6.
  5110.
                 IF (BWDRW.EQ. 2 . OR . REDRW.EQ. 2) THEN
  5120.
                   IFIKHDANT.LT. NEUHNT .AND. KWDMNT.LT.101 THEN
  513 .
                     RWDHNT = KWDMNT + 1
  514 .
                     KNIMNI = KNIMNI + 1
  516C.
                     60 TO 10
  5170.
  5184.
                     CALL FEPRTIKNIMNI, RBHVL S, BRKVLS, BNUP, RNUM, BDEAD,
  5191.
                       FDEAD, BUPN, RWPN, BOSNG, ROSNG, BWDKW, RWDRW, BRDSUM,
                1
  5200.
                       RRUSUM .DS THIND
                2
  5211.
                     PRINT *, "END OF DIAM RUN"
  523.
                   END IF
  524 .
  525 ( ...
                 ELSE IF (KNTHNT.LT.1000) THEN
  526C.
                   KNIMNI = KNIMNI + ]
  5280.
                   60 TO 10
  525.
          C
  53' 6.
                 END IF
  531'
                 DEBUC SUBCHK
 :32:
                 AT 1
  533 .
                 END
VG 2608 DUMMY ARGUMENT 'AFRC' IS NEVER REFERENCED
NG 26C7 VARIABLE "PREP" APPEARS IN A DECLARATION BUT IS NEVER REFERENCED
VG 2608 DUMMY ARGUMENT "SHOTSI" IS NEVER REFERENCED
```

N 3 WARNINGS 765 IBANK 10668 DBANK 31 COMMON

```
DIAMPUBLISH . ARTLSS
R1
     C4/01/82-10:33(0.)
          C=+++++++++++++++++ SUBROUTINE ARTLSS
                                                       *******
   11 7.
   12G.
          C
   130.
          C
   146.
                 SUBROUTINE ARTLSS (KNIMNT, ARPAM, XARTJF, XWPN, XCHR, X ARTLS)
   150.
          C
   166.
          C
                 THIS SUBROUTINE DETERMINES MARTLS(I,J), THE ARTILLERY LOSSES
   170.
                   FOR X FORCE WEAPON TYPE 1 IN TACTICAL MODE J=1,2
          C
   18C.
          C
   190.
          C
                 KNIMNI
                               MINUTE COUNTER FOR DIAM BATTLE
   200.
          C
                 ARPAH 17 1
                               ESTIMATED BATTLE TIME FOR ARTILLERY
                 XARTJF11,31
                               LOSS RATE PER MINUTE FOR X FORCE WEAPON TYPE I
   210.
          C
                               IN TACTICAL MUDE J=1,2
   22.C.
          C
   230.
          C
                               NUMBER OF X FORCE WEAPON TYPE I IN TACTICAL
                 XMFN4I.J+II
                               MODE J=1,2
   241.
          Ĺ
   25C.
          C
                               WEAPON CATEGORY OF X FORCE WEAPON TYPE 1:
                 XCHR4I.43
   260.
          C
                               DISHOUNTED: 1. MORTARS=2. LIGHT=3. HEAVY=4
   27C.
          C
   28 ".
          C
   29 0.
                 DIMENSION
                             XARTJF (10,4), XWPN(10,3), XCHR (10,5), XARTLS (10,2),
   30C.
                1
                             ARPAH181
   410.
          (
   32: •
          C
   33 P.
                 IF (KNTMNT.LE.ARPAMITI) THEN
   340.
          1
                   DO 10 I=1.10
   350.
                     DO 20 J=1,2
   36 P.
          C
   370.
                        IF (XWPN(I,J+)).GT.O) THEN
   38 C.
                          IF (XCHR (I, 4).EQ.1 .AND. J.EQ.1) THEN
   39 13.
                            XARTLSII.JI = 0
   400.
                          ELSE IF IXWPN(1, 31.LT.O) THEN
   410.
                            MARTLEIL, JI = MARTUFIL, 3)
   42 C.
                          ELSE
   43 C.
                            xartls(i,j) = xartjf(i,3) + xwpn(i,j+1) /
                1
   44C.
                              45C.
                          EID IF
   46'.
                       ELSE
   47'.
                          XARTLS (I, J) = C
   48 C.
                       EHD 1F
   45 %
          20
                     CONTINUE
   500.
                   CONTINUE
          10
   516.
          C
   521 .
                 ELSE
   53n.
                   DO 30 1=1,10
   54C.
                     DO 40 J=1.2
                        XARTESII, JE C
   550.
   56 ..
           46
                      CONTINUE
   571.
          30
                   CONTINUE
   580.
           C
   59".
                 E:D IF
   £00.
                 RETURN
   611.
                 DEBUG SUBCHK
   12: .
                 61 1
   63 .
                 LND
```

N 253 IBANK 51 DBANK

```
SIFIED
```

```
DIAMPUELISH . ARTSP
       04/01/82-10:3340.1
  100.
                   Compand the transfer of the contine artsp which the transfer the transfer of the contine the contine transfer of the contine t
  11'.
  170.
                  r
  1 "1 .
                  C
  140.
                                SUBROUTINE ARTSPEKNTHNT, FPFTH, DXWYWP, XARTJF, ARPAH, XWPN,
  150.
                                                                         XCHF, XDFAT, XARTSP1
  1 . C.
                  C
  171.
                  C
                                 THIS SUBROUTINE DETERMINES XARTSP(I.J). ARTILLERY LOSSES
                  C
                                     USED ONLY IN SUPPRESSION FOR X FORCE WEAPON TYPE I IN
  18 .
  190.
                  C
                                     TACTICAL MODE J=1,2
  : CC.
                  C
  210.
                  C
                                KNIMNI
                                                                    MINUTE COUNTER FOR DIAM BATTLE
  22 ".
                  C
                                FPFTM
                                                                    FINAL PROTECTIVE FIRE COUNTER FOR DIAM BATTLE
  23:
                  C
                                                                    DISTANCE FROM X FORCE WEAPON TYPE I IN TACTICAL
                                IL, M, I HAMANKO
                                                                     MODE J=1,2 TO Y FORCE MEAPON TYPE H OF WHICH ONLY
  240.
                  C
  25 .
                  C
                                                                     MESS 20 ARE IN TACTICAL MODE 2
  26 C.
                  C
                                                                     X FORCE ARTILLERY LOSSES FOR WEAPON TYPE
                                XARTUF(1,3)
                  C
  270.
                                                                     I DURING MINUTE
                  C
  261 .
                                                                     TACTICAL HODE J=1.2
  29C.
                  C
                                AFPAM (4)
                                                                     NUMBER OF MINUTES COUNTERPREP
                  C
                                                                     NUMBER OF MINUTES FINAL PROTECTIVE FIRE
  300.
                                 ARPAM 15 1
                  C
  310.
                                 AFPAM (8 )
                                                                    PREP MINUTES FIRED IN DIAM
                  C
  32 G.
                                XDFAT
                                                                     INDEX FOR X FORCE: DEFENDING=1, ATTACKING=2
   730.
                  Ç
                                                                     NUMBER OF X FORCE WEAPON TYPE I IN TACTICAL
                                II+L, IIN9WK
  34 .
                  ſ
                                                                     MODE J=1.2
  350.
                  L
  360.
                  C
  371 .
                                DIMENSION
                                                          DXWYWP(10,20,2),ARPAM(8),XARTJF(11,5),XARTSP(10,2)
  380.
                              1,
                                                           XCHR (10.5).XWPN(10.3)
  39€.
                  C
  41.0 .
                  C
  410.
                  1
                                VAR = 1
  42 ...
                                IF (XDFAT.EQ. 1) THEN
  43C.
                                     PREPIM = ARPAMISE
  44'.
                                 ELSE IF IARPAMIAL GT . OL THEN
                                     PREPTH = ARPAM(8) # 2/3
  450.
  46 .
                                ELSE
  47: .
                                END 1F
  48 .
  49 ...
                                 IF INNTHNT.LE.PREPIMI THEN
  500.
                                     VAR = 2
  510.
                                END IF
  52:
                  C
  53C.
                                UU 16 I=1,10
  54C.
                                      DO 20 M=1.20
  550.
                                          DC 30 J=1.2
  56 1 .
                                               DIST = ABS(DXWYWP(I,H,J))
  57C.
                                               IFIDIST.LT. 2001 THEN
  58C.
                                                    IF (FPFTH.LT. ARPAN (5)) THEN
  59C.
                                                         VAR = 2
  600.
                                                         FPFTM = FPFIM + 1
  61 .
                                                             GO 10 35
  62 C.
                                                    EID IF
  630.
                                               END IF
                  3 C
  64 .
                                          CONTINUE
  65 C.
                  20
                                      CONTINUE
  66 .
                  10
                                 CONTINUE
  671 .
                  ۲.
  680.
                  35
                                 DO 40 I=1.16
                                                                                               3-25
```

```
SIFIED
```

```
DO 50 J=1.2
690.
                   IFEXMPNET, J+11.GT.O1 THEN
700.
                     IFIXCHREI,43.EQ.1 .AND. J.EQ.13 THEN
710.
                       MARTSP41,J1 = 0
720.
                     ELSE IFEXUPNET, 31.LT. DI THEN
730.
                        XARTSP41.J3 = XARTJF41.33
74 E.
                     ELSE
750.
                        XARTSP(1.J1 = XARTJF(1.31 * XHPN(1.J+1) / (XHPN(1.2) * XHPN(1.3))
76 6.
770.
                     END IF
780.
                   ELSE
791.
                      XARTSPILIJI = 0
800.
                    END IF
81 C.
        C
821.
                   XARTSP41,J1 = XARTSP41,J1 + VAR
830.
84C.
                 CONTINUE
        50
85%
               CONTINUE
        40
 96 C.
 8711.
        C
               RETURN
 •2 88
•2 88
               DEBUG SUBCHK
 890.
                AT 1
 900.
                END
 910.
```

# N 353 IBANK 76 DBANK

```
DIAMPUBLISH BSETLD
₹1
     04/01/82-10:33(0.)
   JCG.
          11 ".
  175.
          C
  1 ' '.
          £
  14 .
                SUBROUTINE BSETLD (BNUM, IBU, BSLD, BSLDR, BCHR, IBNFID, BAMO)
  150.
         C
  16F.
         C
                THIS SUBROUTINE LOADS THE AMOUNT OF AMMUNITION AVAILABLE FOR
  170.
         C
                  A PARTICULAR WEAPON TYPE INTO EAMO
  160.
          C
  190.
         C
                             ARRAY FOR AMMUNITION LOAD FOR WEAPON TYPE I
                BAMOII.JI
  200.
          €
                             OF WHICH JET IS THE PRINCIPAL WEAPON AND JEZ
  :10.
          C
                             FOR SECONDARY ROUNDS
  22. •
          C
                BNUM
                             NUMBER OF BLUE FORCE WEAPON SYSTEMS
                             ARRAY POINTING TO PROPER ENTRY IN ARRAY IBNFID
  23".
          C
                18U(1)
  240.
          r
                             FOR THE I WEAPONS CURRENTLY BEING PLAYED IN DIAM
  250.
         C
               BILD
                             FRACTION OF BASIC LOAD AVAILABLE FOR PRIMARY
   ~( 6.
         C
                             SYSTEMS
  270.
         C
               BSLDR
                             FRACTION OF BASIC LOAD AVAILABLE FOR SECONDARY
  275.
         C
                             SYSTEMS
  280.
          C
                BCHR(I.3)
                             BASIC LOAD FOR BLUE FORCE WEAPON TYPE I
  290.
         C
                IBNFID(I,J)
                             ARRAY HULDING PRINCIPAL JIFFY WEAPON DESCRIPTORS
  300.
          C
                                                                        J=1,2 ARE
                             FOR 1=1.25 JIFFY WEAPONS PLAYED IN DIAM.
   31 C.
          C
                             PRINCIPAL HEAPONS ON PLATFORM. AND J=3 CONTAINS A 6
  32 1.
          C
                             WHEN THE WEAPON HAS A SECONDARY SYSTEM
   33C.
          C
  341.
          C
  35 C.
                DIMENSION BANG(10,21,18NFID(25,41,8CHR(10,5),18U(10)
  36C.
         C
  370 .
         C
  381.
         C
                SET LOAD FOR SECONDARY ROUNDS
  39(.
                  FRNDS = 300.0
         1
  400.
         C
                INITIALIZE ARRAYS AND VARIABLES
  41C.
                  VAR = D
  47 E.
                  CALL INITITEAMO.VARI
  438.
                  1 BNUM = BNUM
  441
                LOAD PRIMARY AND SECONDARY ROUNDS
  45 n.
                  DO 10 1=1.1BNUM
  46 C.
                    BAMO(1,11 = BSLD # BCHR(1,3)
  470.
                    IFIIBNFID(IBU(I), 31.EQ.61 THEN
  485.
                      BAMO(1.2) = BSLDR * RRNDS
  456.
                    END IF
  50 G.
                    IF(IBNFID(IBU(II:1):Eq.21 .OR. IBNFID(IBU(II:1):Eq.26) THEN
  510.
                      BAMC41.21 = BSLDR 1 180
  526.
                    END IF
  53 %
         10
                  CONTINUE
  54 .
         C
  551.
                RETURN
  56 · `•
                DEBUG SUBCHK
  571.
                AT 1
  56'.
                END
```

N 174 IBANK 54 DBANK

```
DIAMPURLISH - DMR TO
₹1
     04/01/82-13:33(0.)
   100.
          C+++++++++++++++++++++++ SUBROUTINE DMRTO
                                                         *************
   110.
   121.
          C
   130.
          C
   140.
                 SUBROUTINE DMRTOIXCHR, XWPN, XDMRTOI
   15".
          C
   160.
          C
                 THIS SUBROUTINE CALCULATES XDMRTO, THE RATIO OF X FORCE
   170.
          C
                   DISHOUNTED TROOPS TO X FORCE TROOP CARRIERS
   180.
          Ċ
   190.
         . C
                 XCHR41.43
                              CATEGORY OF X FORCE WEAPON TYPE I:
          C.
   200.
                              DISHOUNTED: 1. HORTARS: 2. LIGHT: 3. HEAVY: 4
   210.
          C
                 XMPN(1.3)
                              NUMBER OF WEAPON TYPE I IN TACTICAL MODE 2
          C
   220.
                 MOTOTX
                              TOTAL NUMBER OF X FORCE DISMOUNTED TROOPS
          C
                              TOTAL NUMBER OF X FORCE MOUNTED CARRIERS
   230.
                 XTOTHC
   240.
          C
   25F.
          C
   26 P.
                 DIMENSION
                            XCHR (10.5).XWPN (10.3)
          C
   270.
   28n.
          C
   295.
          C
                 TOTAL NUMBER OF DISHOUNTED TROOPS
   300.
          1
                   XTOTOM=0
   31 C.
                   DO 1C I=1,10
   320.
                      IFIXCHRII, 4 J. EQ. 13 THEN
   33C.
                        IF (XWPN(1,3).GT.O) THEN
   340.
                          XTOTOM = XTOTOM + XMPN41,33
   35 ! .
                        END IF
   36 0.
                      END IF
   370.
          10
                   CONTINUE
   380.
          C
                 TOTAL NUMBER OF TROOP CARRIERS
   39!
          C
   48 D.
                   X TO TH C = 0
   41C.
                   00 20 1=1.10
   420.
                      JFIXCHRII.41.EQ.31 THEN
   43C.
                        IF (XWPN(I,3).GT.O) THEN
   44C.
                          XTOTMC = XTOTMC + XWPN(1.3)
   45E.
                        END IF
   46 C.
                      END IF
          20
   471.
                   CONTINUE
   481'.
          C
   49C.
                 IFIXTOTHC.EQ.D1 THEN
   500.
                   XTOTH (=-99999
   510.
                   PRINT 1000
   520.
          1000
                   FORMATIJHO, 24H NO EMPTY TROOP CARRIERS I
   531.
                 END IF
   54 T.
                 IFIXTOTOM.EQ.O.1 THEN
   55C.
                   PRINT 1010
   56C.
          1010
                   FORMATISHO, 23H NO DISMOUNTED TROOPS I
   570.
                 END IF
   58C.
          (
   59 C.
                 XEMRTO = XTOTOM/XTOTHC
   ero.
          C
   61 C.
                 RETURN
   62 F.
                 DEBUG
                        SUBCHK
   63C.
                 11 1
   641.
                 ENU
```

N 12E IBANK 55 DBANK

```
SIFIED
```

```
DIAMPUBLISH.DSKLSS
   04/01/82-10:3340,1
 100.
        C **************
                                  SUBROUTINE DSMLSS ***************
 11 .
        C
 171.
        C
 17 .
        C
               SUBROUTINE DSMLSS (X NUMDH , X HPN , X CHR , EXTLSS)
 14'
 15 .
        C
 16%
        C
               THIS SUBROUTINE DETERMINES THE NUMBER OF DISMOUNTED LOSSES
 170.
        C
                 WHILE BEING CARRIED IN TROOP CARRIERS
 110.
        C
 19:
        C
               XNUMDM
                             NUMBER OF X FORCE TROOPS THAT DISMOUNT A
 2.0.
        C
                             CARRIER
        C
 210.
               II+L, IINYWX
                             NUMBER OF X FORCE WEAPON TYPE I IN TACTICAL
 720.
        ί
                             MODE J=1,2
 2 /0.
        C
               XCHR 11,41
                             CATEGORY OF X FURCE WEAPON TYPE 1:
 24".
        C
                             DISMOUNTED=1, MORTARS=2, LIGHT=3, HEAVY=4
 25(.
        C
                             EXPECTED TOTAL LOSSES OF X FORCE WEAPON
               EXILESII, JI
        C
                             TYPE I IN TACTICAL MODE J=1,2
 260.
 270.
        C
 781.
               DIMENSION XWPN (1L, 3), XCHR (10, 5), EXTLSS (10, 2)
 79".
        (
 *. C •
        C
 31 .
        C
               TOTAL ALL MOUNTED TROOPS
 315.
               TOTOM = 0
               DO 10 1=1,10
 321 .
        1
 33C.
                 IF 1xCHR 11,41.EQ.11 THEN
 34C.
                   IFIXWENII, 21.61.0) THEN
 35'.
                     TOTUM = XWPN4I,21 + TOTOM
 36 .
                   END IF
 37 .
                 END IF
 38 .
        10
               CONTINUE
 35 .
        C
 4"0.
               IF (TOTOM.LE.D) THEN
 410.
                 RETURN
 42 .
               LAD IF
 43: .
        •
 44 .
        C
               SEARCH FOR MOUNTED CARRIERS WITH LOSSES
                 00 20 1=1,10
 456.
 4tC.
                   IFIXCHRII, 41.EQ.31 THEN
 470.
                      IFIXUPNII, 21. GT.O1 THEN
 481.
                        IF IXWPN41,31.GE.O) THEN
 49C.
                          IFIEXILSS (1, 11.6 T.O) THEN
 Sac.
        C
 £1 ".
        C
                            CALCULATE MOUNTED KILLS
 52 .
                              TCLSS = EXTLSS(1,1)
                              00 30 J=1,10
 530.
 ₹00.
                                 IF (XCHR(J, 4).EQ.11 THEN
 551.
                                   IF (XWPN(J.2).GT.O) THEN
                                     EXTLSSIJ. 11 = XNUMDM+XHPNIJ.21+TCLSS/TOTDM
 56C.
 5(5.
              1
                                       • EXTLSSIJ.11
 57' .
                                   ENU IF
 59 .
                                END IF
 59 .
        31
                              CONTINUE
 60 D.
        C
 61 .
                          END 1F
 £2 .
                        END IF
                     END IF
 631.
 64 .
                   END IF
 €5°.
        20
                 CONTINUE
 663.
        C
                                            3-29
```

# SIFIED

670.	RETURN
680.	DEBUG SUBCHK
690.	AT 1
700.	END

N 209 IBANK 41 DBANK

```
DIAMPUBLISH . DSNG
     04/01/82-10:3310,1
15
          100.
   11 0.
          C
   1:".
          C
   1 70.
          r
   14'.
                SUBROUTINE DSNG (XHOLDS.XDSNG.XHPN.XCHR.XDEAD.IFRC.DGMATT.
   150.
                                 XMDR# 1
   16'.
          C
  170.
          C
                THIS SUBROUTINE DETERMINES IF THE X FORCE WILL WITHDRAW BASED
  180.
          C
                  ON CUMULATIVE WEAPON CATEGORY KILLS
   151.
          •
   200.
          C
                XDSNG
                               INDEX FOR X FORCE: ENGAGING: 1. DISENGAGING=2
   210.
          C
                               NUMBER OF X FORCE WEAPON TYPES I IN TACTICAL
                II+L, I MANK
   :2 G.
          C
                               M (DE J=1.2
   230.
          C
                               WEAPON CATEGORY OF X FORCE WEAPON TYPE 1:
                XCHR(I,4)
  24 %
          C
                               DISHOUNTED=1, MORTARS=2, LIGHT=3, HEAVY=4
   250.
          C
                               CUMULATIVE DEAD FOR X FORCE HEAPON TYPE I IN
                ADE AD 11 .JI
   260.
          C
                               TACTICAL MODE J=1,2
  27".
          C
                               INDEX FOR X FORCE: BLUE=1, RED=2
                1FRC
                               DISENGAGEMENT ATTRITION FRACTIONS OF WEAPON
  280.
          C
                DGMATTIA .B 1
   29".
          C
                               CATEGORY A AND FORCE B
   3CC.
          C
                               INDEX FOR X FORCE: ENGAGING: 1. WITHDRAWING=2
                XWDRW
          C
                               NUMBER OF LEAPONS DEAD IN WEAPON CATEGORY A
   310.
                CDEADIAL
          C
                               NUMBER OF WEAPONS ALIVE IN WEAPON CATEGORY A
   32 C.
                CALTVEIAL
   33 ".
          C
                XHOLDS
                               INDEX FOR X FORCE: HOLUING POSITION=1, ALLOWED
   340.
          (
                               TC WITHDRAW= 2
   351.
          C
   36 C .
          C
   37'.
                DIMENSION XWPN(10,31,XCHR(10,5),XDEAD(30,2),DGMATT(4,2)
   38C.
               1,CDEAD(4),CALIVE(4)
   39C.
          (
   4 10 .
          (
   41 C.
                IF (XDSNG.EQ. 2) THEN
   420.
                  XWURW=2
   43C.
                  RETURN
   44. .
                END IF
   451.
          C
                IFIXHOLDS.EQ.11 THEN
   466.
   470.
                  RETURN
   48 .
                END IF
   49'.
          C
   500.
                DO 10 1=1,4
          1
   51 .
                  CDEAD (1) = C
   52C.
                  CALIVEIII = G
          10
   530.
                CONTINUE
   541.
   55 C.
                DO 20 TCAT=1.4
   561.
                  DO 35 J=1.2
   536.
                    DO 4C 1=1,1C
   580.
                      IF(XCHR(I,4),EQ.ICAT) THEN
   55(.
                         IF (XWPN(I.J+1).GT.O) THEN
   .033
                           CDEAD (ICAT) = CDEAD (ICAT) + XDEAD (I, J)
                           CALIVETICATI = CALIVETICATI + XWPNTI,J+11
   t10.
   621.
                         END IF
  63 .
                      END IF
          40
                    CONTINUE
   £4' .
          30
   £5 •
                  CONTINUE
   £6' .
          20
                CONTINUE
   67".
          C
                DO 50 ICAT=1,4
   680.
                                          3 - 31
```

```
SIFIED
```

```
IFIICDEADICATE + CALIVETICATELIGY.OF THEN
690.
                  FRCT = CDEAD(ICAT) / (CDEAD(ICAT) + CALIVE (ICAT))
700.
                  IFIFRCT.GE.DGMATTICAT, IFRC )) THEN
710.
                    NUDRU = 2
720.
                  END IF
730.
                END IF
74 C.
              CONTINUE
       50
750.
76 %.
       C
             RETURN
770.
              DEBUG SUBCHK
78 C.
              AT 1
790.
              END
600.
```

# N 229 I BANK 75 DBANK

```
DIAMPUBLISH . ECLOSS
   04/61/12-10:33(6.1
 100.
        C ************** SIBRUUTINE ECLOSS
                                                        ************
 110.
 1. .
        (
 13".
        C
 14 .
               SUBROUTINE ECLOSSIYXPKW, XWPN, PCXVYZ, YRDFR, YFLSFR,
 150.
                                  *SPFDG.EXCLSS!
 1.0.
        (
 175.
        C
               THIS SUBROUTINE CALCULATES EXCLOSII.M.JI. THE EXPECTED
                 COMMITTEE LOSSES FOR X FORCE TARGET TYPES 1 IN TACTICAL
 18.
        C
        C
                 MODE J=1.2 FROM Y FORCE WEAPON H OF WHICH H=11.2C ARE IN
 150.
        C
 300.
                 TACTICAL MODE 2
        C
 71!.
               YXPKWIK .N.L.)
 22 U.
        C
                                SSPK FOR Y FORCE WEAPON K IN TACTICAL MODE
                                L=1.2 AGAINST X FORCE TARGET N OF WHICH
 230.
        (
 240.
        C
                                ARE IN TACTICAL MODE &
              XWPN4I,J411
 25i.
        C
                                NUMBER OF X FORCE WEAPON TYPE I IN
 2t .
        C
                                TACTICAL MODE J=1.2
 270.
        (
                                PERCENT WISIBLE OF X FORCE WEAPON TYPE I
                CXVYZ(1,P,J)
        C
                                IN TACTICAL MODE J=1.2 TO Y FORCE
 32C.
 251.
        C
                                WEAPON TYPE M OF WHICH M=11,26 ARE
 300.
        C
                                IN INCTICAL MODE 2
 310.
        C
               THOFRIK INTLI
                                ROUNUS FIRED BY Y FORCE WEAPON TYPE N
 ·3~[.
                                IN TACTICAL MODE L=1.2 AGAINST X FORCE
        C
        C
                                TARGET TYPE N OF WHICH N=11,20 ARE IN
 33 . .
        C
 340.
                                TACTICAL MODE 2
        C
                                FALSE FIRE FACTOR FOR Y FORCE: INABILITY
 35C.
               YFLSFH
        C
 36' .
                                TO DISTINGUISH TARGETS
        £
                                FIRE SUPPRESSION FOR X FORCE WEAPON
 370.
               *SPFDG11.JI
 38C.
        C
                                TYPE I IN TACTICAL MODE J=1.2
 ٠, ٢٠
        C
 4C C.
                           YXFKW110,20,21, XWPN110,31, PCXW42110,20,21
               DIMENSION
 411 a
                           YRDFR(10,20,2), EXCLSS(10,20,2), XSPFDG(10,2)
              1 .
        C
 421 .
 431.
        C
 44".
        1 00
               UO 10 J=1.2
 45 .
                 PO 50 1=1'10
 46 [ .
                   UO 30 L=1.2
 47 .
                     DO 4C K=1.10
 46 .
        C
                        PCVIS = PCXVY241,K+(L-1)*10,J) * (1 - XSPFUG41,J)*0.33)
 451 .
 SCC.
                       PK = Y>PKW4K, 1+4J-11#10, L1
 5'C.
                        XNMTG = XWPN(1,J+1)
 12.
                        RDFR = YRDFR(K.I+(J-1)*10.L) # YFLSFR
 531.
                        CMMIT : XNMTG * PCVIS
 54 .
                        ACHMIT - AMAX 141 CMMIT )
 55 ".
        (
                        EXCLSS11, k+1L-11+1C,J) = CMMT1 + 41-(1-PK/ACMMTT1++RDFR)
 561.
 57C.
        (
 581.
        40
                     CONT INUE
 50 .
        3 E
                   CONTINUE
                 CONTINUE
 6 C.
        20
 61 .
        10
               CONTINUE
 62 .
        C
 £3'.
               RETURN
 €4 .
               DEBUG SUBCHK
 £51 .
               AT 100
               LND
 Et .
```

```
DIAMPUBLISH .ETLOSS
     04/01/82-10:33(0.)
₹1
   100.
          110.
  17".
          C
   139.
          C
  140.
                SUBROUTINE ETLOSS (XMPN, EXCLSS, EXTLSS)
  150.
         C
  160.
         C
                THIS SUBROUTINE CALCULATES EXTLISION, THE TOTAL EXPECTED
   170.
         C
                  DIRECT FIRE LOSSES OF X FORCE TARGET TYPE I IN TACTICAL
                  MODE J=1,2
   175.
          C
   185.
          €
   190.
         C
                                NUMBER OF X FORCE WEAPON TYPE I IN TACTICAL
                II+L, IIN9WX
   200.
         C
                                MUDE J=1,2
         C
                EXCESS41,M,J1
   210.
                                EXPECTED COMMITTEE LOSSES FOR X FORCE TARGET
          C
   52 P.
                                 TYPE I IN TACTICAL MOUE J=1,2 AGAINST Y FORCE
   230.
          C
                                 WEAPON TYPE M OF WHICH M=11.20 ARE IN TACTICAL
   24C.
          C
                                MUDE 2
   25!'.
          C
   2£ .
          (
   270.
                DIMENSION XWPN 110, 31, EXCLSS 110, 20, 21, EXTLSS 110, 21
   280.
          C
   291.
          C
   300.
          100
                DO 16 J=1.2
   310.
                  DO St 1=1,10
   320.
                    SRV = 1
   33 ~
                    DO 30 L=1.2
                      DO 46 K=1,10
   340.
   350.
          C
   3611.
                        III+L, I POPER, . I PI KAMA = NGWKA
   37C.
                        SRV = SRV + 11 - EXCLSS11. K+1L-11+10. J1 / AXHPN1
   380.
          C
   391 .
         40
                      CONTINUE
   400.
         3 C
                    CONTINUE
                    EXTLSS41,J) = XWPN(1,J4)) + (1 - SRV)
   41 C.
         20
   42 C.
                  CONTINUE
   436.
         10
                CONTINUE
   44 ( .
   45' .
                RETURN
   46 ".
                DEBUG SUBCHK
   475.
                001 TA
   484.
                END
```

N 137 1BANK 46 DBANK

```
SIFIED
```

```
IKUNI. HZIJBU AMAID
RI
     04/01/82-10:33(0.)
           C:+**************
   100.
                                      SUBROUTINE INDX1
                                                          ******
   110.
           (
   1: .
           C
   1214
          C
   14 .
                 SUBROUTINE INDXIIDFRC.BDFAI.RDFAI.BFRCTP.BDMMAX.RDMMAX.
   150.
                1
                                   BUDRW .RWDRW .BDMV .RDMV .BOVWTH . ROVWTH )
   100.
          C
          C
                 THIS SUBROUTINE PASSES THE FOLLOWING INDEXES FOR BLUE
   17 .
          C
   16.
                   AND RED FORCES:
   150.
          ï
   2.0.
          C
                 DFRC
                           1 = BLUE FONCE DEFENDS
   210.
          C
                           2 = FED FORCE DEFENDS
   22 .
          C
                 BUFAT
                           1 : BLUE FORCE DEFENDS
          C
                           2 = BLUE FORCE ATTACKS
   23C.
   24 ".
          C
                 LUFAT
                           1 = RED FORCE DEFENDS
   250.
          C
                           7 = FED FORCE ATTACKS
          C
   26 .
                 BERCIE
                           1 : LIGHT FUFCE
          C
   270.
                           2 = HEAVY FORCE
          C
                           MAXIMUM NUMBER OF BLUE TROOPS PER CARRIER
   asc.
                 BUMMAX
          C
                 KOMMAX
                           MAXIMUM NUMBER OF RED TROOPS PER CARRIER
   29 .
   3.0.
          C
                           1 = BLUE FORCE ENGAGES
                 BWURL
          C
                             - BLUE FORCE WITHDRAWS
   ?1 .
          C
                           1 = RED FORCE ENGAGES
   32 ' •
                 RWDRW
   330.
          C
                           2 = RED FORCE WITHDRAWS
          ¢
   34' .
                 BOMV
                           1 = BLHE FORCE IS MOUNTED
   350.
          C
                           2 = BLUE FOICE IS DISHOUNTED
   3eC.
          C
                 LUMV
                           1 = PED FORCE IS HOUNTED
   370.
          C
                             = RED FORCE IS DISMOUNTED
   38 .
          C
                 BOVUTH
                            = BLUE FORCE IS NOT IN OVERWATCH
                           1
   39 .
          C
                           2 = BLUE FORCE IS IN OVERWATCH
   4CC.
          C
                           1 = RED FORCE IS NOT IN OVERWATCH
                 ROVWIH
          C
                           2 = RED FORCE IS IN OVERWATCH
   41 C.
          C
   42 .
   43 .
          C
   441.
          C
                 DETERMINE IF RED OR BLUE FORCES ARE ATTACKING OR DEFENDING
   45C.
                   IFIDFAC. EQ. 11 THEN
   461 .
                      80FA1=1
          1
                     RDFATT2
   4 7C.
   44 .
                   ELLE
   45.
                     BDFAT: 2
   5C '.
                     FOFATE1
   516.
                   END IF
   52.
          C
   53 .
          C
                 DETERMINE MAXIMUM NUMBER OF TROOPS PER RED AND BLUE CARRIERS
   54C.
                   IF (BFRC 'P.EQ. 1) THEN
   550.
                      BUMMAXIS
   5é .
                   ELSE
   57 .
                     BDMMAX = 7
   58 .
                   END IF
   59'.
                   ROMMAXIS
   €' €.
          (
   £1 .
          C
                 SET WITHDRAWAL INDEXES
   (2°.
                   BWURW=]
   13.
                   RWIRE:1
   (4C.
           C
   £5 .
          C
                 SET DISMOUNT INDEXES
                   FOMAE 5
   €€ %•
   6 .
                   ROMV=2
                                            3-35
   686.
          C
```

```
SIFIED
```

SET OVERWATCH INDEXE 690• 700• C BOVWTH= 1 ROVWTH=1 71 % · C 720. RETURN 731. DEBUG SUBCHK 740. AT 1 75 . END 761.

# N 57 IBANK 27 DBANK

```
DTAMPUBLISH . INDX2
15
     04/01/82-10:33(0.1
   ICC.
          · **************
                                   SUBROUTINE INDX2 **************
   11".
          C
  121.
          C
  13'.
          €
                SUBROUTINE INDX2(KNTMNT, KWDMNT, FPFTM, BDSNG, RDSNG, AMFLD.
  14%
                                   BDFAT, BFL SFR, RFL SFR, BHOLDS, RHOLDS 1
               1
  150.
   .60.
          C
                 THIS SUBROUTINE INITIALIZES THE FOLLOWING VARIABLES AND
  170.
          C
          C
                   INDEXES
  180.
   151.
          (
  210.
          C
                KNIMNI
                            MINUTE COUNTER FOR DIAM BATTLE
  210.
          C
                KWDMNT
                            MINUTE COUNTER DURING WITHDRAWAL IN DIAM
          C
                EPETM
                            MINUTE COUNTER FOR FINAL PROTECTIVE FIRES
   220.
  230.
          C
                            INDEX FOR X FORCE: 1=ENGAGING, 2=JISENGAGING
                 BDSNG
  24 .
                            INDEX FOR Y FORCE: 1=ENGAGI: 3. 2=JISENGAGING
          C
                POSNG
                            INDEX FOR MINES IN USE: 0=NO. 1=YES
  250.
          (
                 AHFEDIII
          C
                 AMELD 12 1
                            HINEFIELD WIDTH
  261.
          C
                            MINEFIELD FRACTION NOT BYPASSED
  270.
                 AHFLD (3.)
                            FRACTION OF ATTACKING FORCE ENTERING MINEFIELD
  280.
          C
                 A"FLD 14 1
   30 C •
          C
                            FALSE FIRING FACTOR FOR BLUE FORCE
                 BFLSFR
                            FALSE FIRING FACTOR FOR RED FORCE
   31 6.
          C
                 RFLSFR
                             INDEX FOR BLUE FORCE: 1=DEFENDING, 2=ATTACKING
   320.
          C
                 BUFAT
                             INDEX FOR BLUE FORCE: 1=BLUE FORCE HOLDS POSITION.
   330.
          C
                 SHOLDS
                            2 -BLUE IS ALLOWED TO WITHDRAW
   341 .
          C
                             INDEX FOR RED FURCE: 1=RED FORCE HOLDS POSITION.
   35 ' •
          C
                 RHOLDS
   360.
          C
                             2=RED IS ALLOWED TO WITHDRAW
   37' .
          C
   38 .
          C
   39' .
                 DIMENSION AMPLD (4)
   400.
          (
   41 .
          C
   421.
                 INITIALIZE VARIABLES:
                   KNIMNITI
   #3C.
   44 C.
                   KWOMNTEG
                   FPF TM = C
   45C.
   461.
                   BDSNG=1
   470.
                   ADS NG = 1
   48 ...
                   BHOLD S=?
   490.
                   RHOLDS=2
   500.
          C
   510.
                   00 10 1:1.4
   520.
                     AMPLDII: = 0
   531.
          1 G
                   CONTINUE
   54'
          (
   55 C.
                 IF (BOFAT.EU.1) THEN
                   BFLSFR = 0.8
   56'.
                   FFLSFR : C.4
   57' .
   580.
                 ELSE
   59'
                   BFLSFR
                             0.4
                   FFLSFR - 0.8
   6CG.
   610.
                 END IF
   €2 %
           C
   631.
                 RETURN
   £41.
                   END
```

N 54 IBANY 22 DBANK

```
DIAMPUBLISH .INITI
  04/01/82-10:3310.1
       100.
       C
 110.
 120.
       C
             SUBROUTINE INITIARRAY, VARI
 121.
             THIS SUBROUTINE INITIALIZES ARRAY(I,J) TO EQUAL VAR
       C
 122.
       C
 130.
       C
 150.
 16%
        C
             DIMENSION ARRAY (10,2)
 17%
        ¢
 180.
 1911.
        C
             00 .10 J=1,2
 200.
               DO 20 I=1.10
 210.
        C
 220.
                 ARRAY 11, J1 = VAR
 230.
        C
 235.
               CONTINUÉ
        20
  240.
              CONTINUE
        10
 25 11.
  261.
        C
              RETURN
  2713.
              END
 . 280.
```

4 40 IBANK 15 DBANK

### SIFIED

```
DIAMPUBLISH .INTART
   64/81/82-18:3316,1
 100.
       11 . .
        C
 17 .
        (
 1 ...
       C
 141.
             SUBROUTINE INTART (ARPAM, BARTJE, RARTJE)
 150.
 164.
       C
             THIS SUBROUTINE DETERMINES ARTILLERY LOSS RATES TO USE IN DIAM
 170.
        C
                          ESTIMATED BATTLE TIME FOR ARTILLERY
 131.
        C
             ARPAM 17 1
 190.
       C
             BARTUF(1,4)
                          NUMBER OF BLUE FORCE WEAPON TYPE I LOSSES DUE TO
 200.
       C
                          ARTILLEFY
 230.
       C
             BARTUF(1.3)
                          NUMBER OF BLUE FORCE WEAPON TYPE I LOSSES PER
       C
                          MINUTE DUE TO ARTILLERY
 32 .
           FARTJF(1,4)
231.
       C
                          NUMBER OF RED FORCE WEAPON TYPE I LOSSES DUE TO
 240.
       C
                          ARTILLERY
             KARTJF(1,3)
                          NUMBER OF RED FORCE HEAPON TYPE I LOSSES PER
 250.
       C
26 .
       C
                          MINUTE DUE TO ARTILLERY
 27.
181.
       (
 29".
             DIMENSION BARTUF (10,4), RARTUF (10,4), ARPAM (8)
 300.
 31 .
       (.
 ?2 G.
       1
             00 10 1=1,10
 336.
               BARTJF11,31 = BARTJF11,41 / AKPAM471
 34C.
               RARTUFIL,31 = RARTUFIL,41 / ARPAMITI
 35 "•
       10
             CONTINUE
 36 .
       C
 37 .
             RETURN
 36.
             DEBUG SUBCHK
 3° °•
             1 14
 4 0.
             ENU
```

N 95 IBANK 31 LBANK

```
DIAMPUBLISH . INTOST
     C4/01/82-10:33(0,)
R1
           C: ***** *** *** **** *** *** * SURROUTINE INTDST ***** ****
   100.
   110.
   12".
           C
   130.
           C
   140.
                  SUBROUTINE INTOSTIFEC, XCHR, XWPN, OFCWC, DXFXWP)
   150.
           C
   160.
           C
                  THIS SUBROUTINE INITIALIZES DAFAMPAL, JI, THE DISTANCE
   170.
           C
                    FROM X FORCE CENTROID TO X FORCE WEAPON TYPE I IN
   180.
           ε
                    TACTICAL MODE J=1.2
   190.
           C
   200.
           C
                  IFRC
                                    INDEX:
                                            1=BLUE FORCE, 2=RED FORCE
   210.
           C
                  XCHR(1,4)
                                    WEAPON CATEGORY FOR X FORCE MEAPON TYPE 1:
   220.
           C
                                    DISMOUNTED=1. MORTARS=2. LIGHT=3. HEAVY=4
   236.
           C
                  XWPN(I,J+1)
                                    NUMBER OF X FORCE WEAPON TYPE I IN
           C
   240.
                                    TACTICAL MODE J=1.2
   25 P.
           C
                  DECUCIB, IFRC 1
                                    DISTANCE FROM IFRC CENTROID TO
   260.
           C
                                    WEAPON CATEGORY CENTROID B
           C
   27C.
           C
   28: .
   29 €.
                  DIMENSION
                             XCHR (1U.5).XWPN (10.3).DFCWC (4.2).DXFXWP (16.2)
   300.
           C
   31 .
           C
   32 0.
           1
                  DO 10 J=1.2
   33 C.
                    DO 20 I=1,10
   340.
           C
   35 II.
                      1F(XWFN(1.J+11.GT.D) THEN
   36 D.
                        IF ( 1 X CHR 4 I , 4 ) . E Q . 1 3 . AND . 4 J . E Q . 1 ) 1 THE N
   370.
                           DXFXWP(1.J) = -9999999
   38 ( .
                           DXFXWP41.J1 = DFCWC1XCHR41.41.1FRC1
   390.
   40C.
                        END IF
   41 %
                      ELSE
   42 ".
                        DXFXWP(I,J) = -5995999
   43C.
                      END IF
   44 0.
           C
   451%
           20
                    CONTINUE
   46 D.
           10
                  CONTINUE
   47 C.
           C
   48 %
                  RETURN
   49 P.
                  DLBUG
                         SUBCHK
   5.0.
                  AT 1
   510.
                  END
```

N 153 IBANK 47 DBANK

```
SIFIED
```

```
DIAMPUBLISH.JFLSS
     64/61/82-10:33(6.1
21
   100.
          110.
          C
   12".
          C
   137.
          C
   14'.
                SUBROUTINE JFLSSIYCHR, YWPN, EYCLSS, EYTLSS, YARTLS, YMNLSS, XYKYLSJ
   150.
          (
  16.
          C
                THIS SUBROUTINE CALCULATES XYMVESIM, 11, THE KILLER VICTIM
          C
   17'.
                  SCOREBOARD FOR X FORCE KILLER WEAPON TYPE M AGAINST Y
          C
                  FORCE VICTIM WEAPON TYPE I. THE LOSSES ARE UPDATED AND
   180.
          C
                  CUMULATED EVERY MINUTE.
   19'
   100.
          C
   210.
          C
                EYCLSSII.M.JI
                                THE EXPECTED COMMITTEE LOSSES FOR Y FORCE
   220.
          C
                                TARGET TYPE I IN TACTICAL MODE J FROM THE
          C
   230.
                                OPPOSING FORCE WEAPON TYPE M OF WHICH
   240.
          C
                                J=11.2. ARE TACTICAL MODE 2
   2 ° C •
                                THE TOTAL EXPECTED LOSSES FOR Y FORCE
          C
                EVILSSII, JI
   26 .
          C
                                REAPON TYPE I IN TACTICAL MODE J=1,2
          C
                                LOCAL ARRAY HOLDING NUMBER OF WEAPONS
   27 .
                A"ILL (M)
          C
                                KILLED BY WEAPON TYPE H
   2:0.
   25 .
          C
                CLOSS
                                TOTAL NUMBER OF VICTIMS BY COMMITTEE LOSSES
   300.
          C
                                KILLED BY WEAPON TYPE M
   310.
          C
                                ARTILLERY LOSSES FOR Y FORCE WEAPON TYPE
                TL, I ) 2 JT RAY
   32 C.
          C
                                I IN TACTICAL MODE J=1.2
   330.
          C
                IL, I DEZINMY
                                MINE LOSSES FOR Y FORCE WEAPON TYPE I IN
   34'.
          C
                                TACTICAL MODE J=1,2
   31.
          C
   3t ".
          (
   37'.
                DIMENSION EVCLSS(10,20,2), EYTLSS(10,2), XYKVLS(12,13)
               1,
   380.
                            AKIL & (10), YARTLS (10, 2), YHNLSS (10, 2), YWPN (10, 3)
   3500
               2,
                            EKILL(10,10), EZTLSS(10,2), YCHR(10,5)
   410.
          (
   41 .
          C
   42 % .
          C
                COPY EXPECTED LOSSES DURING MINUTE
   43.
                  DO 11 J=1.2
          1
   44C.
                     DO 2C I=1,10
   450.
                       EZTLSSII, J1 = [YTLSSII, J1
          20
   46 .
                    CONTINUE
   47 .
          16
                  CONTINUE
   48 .
          C
   451.
          C
                EXCLUDE MOUNTED INFANTRY LOSSES
   52 .
                  00 30 171,10
   530.
                     'FEYCHPEL, 43.EQ.1 .AND. EYTLSSEL, 11.GT.OJ THEN
   54 .
                       EZTESSII.II = L
   56 .
                     END IF
   57 %
          30
                  CONTINUE
   581 .
   59.
          C
                CALCULATE ARTILLERY AND MINE LOSSES AGAINST VICTIMS
   60C.
                  DO 4F I=1.10
   610.
                     XYKVLS(11,1) = YARTLS(1,1) + YARTLS(1,2) + XYKVLS(11,1)
   €200
                     XYKVLS(17,I) = YMNLSS(1,I) + YMNLSS(1,2) + XYKVLS(12,I)
   £? .
          47
                   CONTINUE
   (41):
          C
   €5 .
                CALCULATE KILLER/VICTIM SCOREBOARD EXCLUDING MOUNTED INFANTRY
                  UO 70 I=1,10
   666.
                     (LOSS = 1
   6 70.
   £ 61 .
                     DO SC M=1.10
   651.
                       AKILLIMI = EYCLSSII, M, 11 + EYCLSSII, M, 21
                       AKILLIM) = AKILLIM) + EYCLSS(I,M<10,1) + EYCLSS(I,M+10,2)
   708.
   71 C.
                       CLOSS = CLOSS + AKILLIMI
```

```
720.
        5 D
                    CONTINUE
 73 %.
                    COMPLETE FRACTION OF VICTIM I WILLED BY WEAPON M
        C
 740.
                      DO 68 M=1.18
                         IFICLOSS.GT.CI THEN
 750.
 76 5.
                           BKILL(M,I) = AKILL(m) * (FZTLSS (], 1) * EZTLSS (I, 2) 1/CLOSS
 77 0.
                           XYKYESIM, I) = XYKYUSIM, I) + BKILLIM, I)
 780.
                        END IF
 791:4
        60
                      CONTINUE
 800.
        76
                  CONTINUE
 810.
 82 C.
        C
                TOTAL KILLER/VICTIM TROOP CARRIER LOSSES
 830.
                  TOTCKL = 0
                  DO 80 M=1.10
 840.
 850.
                    DO 90 I=1.1C
 86 0.
                      IFIYCHRII,41.EQ.3 .AND. YHPNII,31.NE.-9991 THEN
 670.
                         TOTCKL = TOTCKL + BKILL (M.I)
 et 88
                      END IF
 890.
        9 C
                    CONTINUE
 900.
        80
                  CONTINUE
 91 %
        C
                CALCULATE KILLER/VICTIM SCOREBOARD FOR MOUNTED INFANTRY
 92 17.
        C
 930.
                  DO 100 M=1.1G
 94C.
                    DG 110 1=1.10
 950.
                      IFIYCHRII,41.EL.3 .AND. YHPNII,31.NE.-9991 THEN
 96 11.
                         CARR = BKILLIM.II
                         DO 120 J=1.10
 97 %.
 980.
                           IFIYCHRIJ, 41.EQ. 1 . AND. EYTLSSIJ, 11.GT.C) THEN
 985.
                             IF ( TOTCKL .GT. U) THEN
 99 !.
                               XYKVESIM, J) = XYK VESIM, J] + (CARR/TOTCKE)
 995.
              1
                                  * EYTLSSIJ.11
                             END IF
1010.
1 (15.
                           END IF
1 20.
        120
                         CONTINUE
1030.
                      END IF
                    CONTINUE
1 (40.
        110
1 750.
        100
                  CONTINUE
1 060.
         C
1 f:70.
         C.
1080.
               RETURN
1 390.
               DEBUG SUBCHK
1100.
                AT 1
1113.
               L ND
```

N 557 1BANK 227 LEANK

```
DIAMPUGLISH.LRDT
   04/01/82-10:33(0.1
        101.
 116.
        £
 12'.
        €
 13 .
        €.
 14: .
              SUBROUTINE LEDT IBERCIP, RENCIP, DPSTR, TACAL
 150.
 1EL.
              THIS SUBROUTINE INITIALIZES THE FOLLOWING VARIABLES
        C
 17C.
        C
                AND THE TACTICS ARRAY. TACTICS PERIAIN TO ATTACKER
                LIGHT AND HEAVY CATEGORY WEAPONS ONLY. LIGHT
 18C.
        C
 19".
                SYSTEMS WHICH ARE TROUP CARRIERS CAN DISMOUNT
        C
 `CC.
        C
                INFANTRY. AND HEAVY SYSTEMS CAN GO INTO OVERWATCH.
 .10.
        C
 22 .
        C
              BERCIP
                       INDEX FOR BLUE FORCE: LIGHT=1, HEAVY=2
 236.
        C
              RERCTP
                       INDEX FOR RED FORCE: LIGHT=1. HEAVY=2
              DESTR
 24L.
        C
                       INDIX FOR DEFENSE POSTURE: PREPARED=1,
 21 .
        C
                       HASTY= 7. AMBUSHED = 3
 27 .
        C
                       BLUE FORCE CENTROID (MAX IS 1000 METERS)
 78: .
        C
 25 %
              THE FOLLOWING EXPLAIN THE SUBSCRIPTS FOR TACALLUI
        C
 30.0.
        C
                       ATTACKING LIGHT CATEGORY HEAPON
                1:1
 310.
        C
                1 = 2
                       ATTACKING HEAVY CATEGORY WEAPON
 326.
        C
                J=1
                       FOINTER TO PEFENDER WEAPON CATEGORY WHO INITIATES
 ₹3 .
        C
                       PACTICAL MODE CHANGE FOR I
 34'.
        C
                       DISTANCE FROM DEFENDER TO ATTACKER AT WHICH
                J:2
 350.
                       TACTICAL MODE CHANGE OCCURS.
        C
 3(1)
                       PERCENTAGE OF 1=2 TYPE WEAPONS THAT GOES INTO
        C
                J = 3
 370.
        C
                       TACTICAL MODE CHANGE. FOR I=1 TYPE WEAPONS ALL
 380.
        C
                       'ROOP CARRIERS WILL DISMOUNT TROOPS
 751 .
        C
 urg.
        •
 410.
              DIMENSION TACA (2,3)
 42 D.
        C
 43 🐪
        C
 440.
        1
              BERCTP = 1
 450.
              FFRCTP : 1
 4t C.
               PSTR = 1
 4" .
        L
 490.
              00 15 1=1,2
 50 .
                TACA(1,11 = 1
 51C.
                TACA( ), 11 = 300
 500.
                TACA41, 11 = 0.33
 53 %
        10
              CUNTINUE
 54 .
 55 %
              RETURN
 56 °.
              DEBUG SUBCHK
 5 / .
              LT 1
```

N 63 IBANK CI UBANK

E N.D

580.

```
DIAMPUBLISH .MINCHR
   04/01/82-10:33(0.)
        C ***** ** * ********* SUBROUTINE MINCHR
                                                        ***** ***** ****
 100.
 110.
 120.
 130.
        ε
 140.
               SUBROUTINF MINCHR (AMFLD &FMNFLD &BMNFLD &DFCWC &DFRC &AMLSR)
 150.
        C
               THIS SUBROUTINE REQUESTS MINEFIELD INFORMATION FOR THE
 160.
        C
                 DEFENDING FORCE FROM THE GAMER
 178.
        C
 180.
        C
               AMFLD (1)
                            INDEX FOR PLAYING MINEFIELDS: NO=0, YES=1
        C
 190.
               AHFLD123
                            MINEFIELD WIDTH
        C
                            MINEFIELD FRACTION NOT BYPASSED
 200.
               AMFLD (31
                            FRACTION OF ATTACKING FORCE ENTERING MINEFIELD
 210.
        C
               ANFLD 14 1
        C
                            LOCATION OF FRONT EDGE OF MINEFIELD
 22 C.
               FMNFLD
        C
 230.
                            LOCATION OF BACK EDGE OF MINEFIELD
               BHNFLD
        C
 240.
               AMLSRIII
                            MINEFIELD LOSS RATES FOR ATTACKING WEAPON
        C
 250.
                            CATEGORY TYPE I=1.4:
                            DISHOUNTED=1: MORTARS=2: LIGHT=3: HEAVY=4
        C
 260.
 270.
        C
               DfCWC(I,J)
                            DISTANCE FROM FORCE CENTROID J=1.2 TO WEAPON
 280.
        C
                            CATEGORY 1=1,4: BLUE=1, RED=2,
 290.
        C
                            DISMOUNTED=1, MORTARS=2, LIGHT=3, HEAVY=4
 300.
        C
               DFRC
                            INDEX FOR DEFENDING FORCE: BLUE=1. RED=2
 310.
        C
 320.
        C
 325.
               COMMON/REED/JDAY1,XINX143,1CARD(203,1HY,1HN,1H0,1HUES,1HNO
 329.
        C
 33 Pe
               DIMENSION AMPLD(4), DFCHC(4,2), AMLSR(4)
 340.
        C
 345.
        C
 350.
        Ç
               INITIALIZE MINEFIELD LOSS RATES
 36 ∵•
        C
 371.
        1
                 AMLSR (11) = 0.10
 300.
                 AMLSR (2) = 0.14
 390.
                 AHLSR 431 = 0.14
 400.
                 AMLSR (4) = 0.14
 41C.
        C
 42 C.
        10
               PRINT 1000
        1000 FORMAT(1), "IS THE DEFENDER USING MINES IN THE 200-400 METER".
 430.
 440.
              1 RANGE BAND? 1
 45C.
               CALL REEDAIJANS)
 470.
               IF (IANS . CG. IHY) THEN
 48C.
                 AMFLD (1) = 1.5
 490.
                 ELSE IFIIANS. NE. IHY . AND. IANS. NE. IHNI THEN
 50G.
                 GO 10 1C
 57.5.
               ELSE
 520.
                 RETURN
               END IF
 53C.
 54 0.
        C
 55 C.
        20
               PRINT 1010
 56: .
        1010 FORKAT(1%, "ENTER WIDTH OF MINEFIELD IN METERS")
 57C.
               CALL REED4
 575.
               AMFLD 121 = XINX 111
               IFIAMFLD121.LT.U .OR. AMFLU121.GT.59991 THEN
 580.
 59C.
                 60 10 20
               END IF
 60D.
 61 %
        C
        30
               PHINT 1020
 62 La
        1020 FORMATTIX, TENTER FRACTION OF MINEFIELD NOT BYPASSED BYT,
 63 %
              1 ATTACKER 1
 E4C.
 65E.
               CALL REED4
                                          3-44
```

SIFIFD

```
SIFIED
   655.
                 AMPLD (3) = XINX (1)
   66 D.
                 IF (AMFLD(3).LT.C .OR. AMFLD(3).GT.1.0) THEN
   670.
                 END IF
   680.
   69' .
                 PRINT 1030
   710.
           40
          1036 FORMATCIX, WHAT FRACTION OF THE ATTACKING FORCE ENTERS *
   71 ".
   72 D .
                1"THE MINEFIELD?")
                 CALL PEED4
   730.
                 AMPLD441 = XINX 111
   735.
   74: .
                 IF (AMFLD (4 1. LT. 0 . OR. AMFLD (4 1. GT. 1. G) THEN
                   5 7 TO 4C
   75℃.
   76 .
                 END IF
   770.
                 PRINT 1040
   78 .
                 FORMATIIX, "DO YOU WISH TO CHANGE INPUTS?" I
   79 ".
           1046
   SIC.
                 CALL REEDATIANS!
                 IF (IANS . EQ . IHY) THEN
   311.
   82G.
                    GO 10 1C
                 END IF
   83.
   P4 .
                 FIX FRONT AND REAR EDGES OF THE MINEFIELD
   85 .
           C
                   FMNFLD = 400 + DFCHC(1,DFRC)
   86C.
   £70.
                   BMNFLD = 200 + UFCHC(1),DFRC)
   . 83
           C
                 RETURN
   89 .
                 DEBUG SUBCHK
   5. Q.
                 Al 1
   71 ·
                 IND
   92 .
```

N 27" IBANK 143 DEANK 36 COMMON

STETED

```
DIAMPUBLISH . MNLSS
     04/01/82-10:3310:1
R1
                                     SUBROUTINE MNLSS ****************
          100.
          €
   110.
   120.
          C
   175.
          C
                 SUBROUTINE MNLSS(AMFLD, AMLSR, AWDTH, DSTBR, FMNFLD, BMNFLÚ,
   140.
                                   XCHR .XWPN . DXFXWP .XMNLS 51
   151 .
          C
   16%
                 THIS SUBROUTINE COMPUTES ATTACKER LOSSES FROM DEFENDER
          C
   17 .
                   MINEFIELDS
   180.
           C
   19 .
           C
                               CORRIDOR WIDTH FOR ATTACKER FOR WEAPON CATEGORY
                 ALDTHII .JI
   200.
           C
                               I=1.4 AND IN HANGE BAND J=1.5:
           C
                               DISMOUNTED=1, MORTARS=2, LIGHT=3, HEAVY=4;
   210.
           C
   220.
                               0-203=1, 200-400=2, 400-600=3, 600-800=4,
           C
   230.
                               800-1000:5
           C
                               INDEX FOR DEFENDER PLAYING MINES: NOTI, YESTE
    2410
                  A"FLD 13 1
           C
    250.
                               MINEFIELD WIDTH
                  ARFLD (2)
           C
    26 D.
                               MINEFIELD FRACTION NOT BYPASSED
                  AMFLD(3)
                               FRACTION OF ATTACKING FORCE ENTERING MINEFILLD
    270.
           C
                  AMFLD 14 )
    284.
           C
                               MINE LOSSES TO WEAPON TYPE I IN TACTICAL MODE
                  IL. I HELSHAK
           Ĉ
    290.
                                J= 1.2
           C
                                ATTACKER POSITION RELATIVE TO THE FRONT FDGE OF
    3110 .
                  DXMEM
           C
    33 %
                                THE MINEFIELD
           C
                                ATTACHER POSITION RELATIVE TO THE REAR EDGE OF
    32 D.
           C
                  DINBH
    33 .
                                THE MINEFIELD
           C
    340.
                                PERCENT TERRAIN COVERAGE OF THE MINEFIELD
                  PVC
           C
                                DISTANCE BETWEEN RED AND BLUE FORCE CENTROLDS
    35 %
           C
                  DSTBH
    360.
                                DISTANCE FROM X FORCE CENTROID TO X FORCE
                  DXFXWP41,J1
           C
    370.
                                WEAPON TYPE I IN TACTICAL MODE J=1+2
           C
    38".
                                WEAPON CATEGORY FOR X FORCE WEAPON TYPE I:
                  XCHF41,41
            C
    390.
                                DISMOUNTED=1. MORTARS=2. LIGHT=3. HEAVY=4
            C
    40 G .
                                LOCATION OF FRONT EDGE OF MINEFIELD
                  FNNFLD
    41 ".
            C
                                LOCATION OF BACK EDGE OF MINEFIELD
                  BMNFLD
            C
    42 .
    430.
            (
            €
                  DIMENSION AMPLD(4), AMLSR(4), ANDTH(4, 5), XMNLSS (30, 2),
     44 .
    45°.
                              DXFXHP41G,21,XCHR41Q,51,XMPN41D,31
    460.
     47".
            C
     48('.
            C
                   CHECK FOR MINE TELD PARAMETERS
            C
     490.
                     IF(AHFLD(1)).EG.O .OR. AMFLD(4).EQ.D) THEN
     500.
            1
                       RETURN
     510.
                     END IF
     520.
     530.
            C
                   ZERO-OUT PAST MINEFIELD LOSSES
     540.
            C
                     VAR = 0
     55 %
                     CALL INITICAMNESS . VARI
     560.
            C
     57 %
                   CHECK FOR ENTRANCE INTO MINEFIELD
     58 C.
                     DO 30 1=1.10
     5904
                       DO 40 J=1.2
     600.
                         NEHT ID. TO. II+L, INGERIEI
     610.
                            DXWFM = DSTBR - DXFXWP11,J1 - FMNFLD
     62 .
                            DAMBH = DSTBR - DAFAMP(1,J) - BMNFLD
     630.
                            IF (DXWFH.LE.C .AND. DXWBH.GE.U) THEN
     64 -
     65: .
             C
                              CALCULATE MINE LOSSES
     66 ".
             C
                              IF tANDTHE XCHR 11 . 41 . 11 . 61 . CT THEN
     67°.
                                PCV = AMFLD(2) * AMFLD(3) / AWDTH(XCHR(),4),1)
     680.
```

3-46

```
SIFIED
                                XMNLSS(1,J) = XWPN(1,J+1) + PCV + AMFLD(4)
   690.
                                   * AMESRIXCHRII, 4)1
   700.
                1
   710.
                            ENT IF
                          E'D IF
   72 0.
                       E 'ID IF
   73'.
   74' .
         4 C
                     CONTINUE
         . 30
   75 .
                   CONTINUE
   76 ".
          C
   77 .
                 RETURN
   78 3.
                 DIBUG SUBCHK
                 AT 1
   790.
   8 0.
                 END
```

% 273 IBANK 78 DBANK

SIFIED

```
DIAMPUBLISH . MOVIN
   04/01/62-10:33(0.)
 100.
        C ***************** SUBROUTINE MOVIN
                                                     **************
 110.
        C
 129.
        C
 130.
        C
              SUBROUTINE MOVINGIOBS.IOPN.KK27.KK20.BMVRT.RMVRT.BUTCT.RUTCT)
 14G.
 150.
        €
              THIS SUBROUTINE LOADS BLUE MOVEMENT RATES AND DETECTION
 160.
        C
                 DATA AND RED HOVEMENT RATES AND DETECTION DATA FROM
 170.
        C
 18C.
        C
                 FANDOM ACCESS FILES 27 AND 20
 19:
        C
 200.
        C
               IOBS
                              POINTS TO THE DAY TYPE: 1=CLEAR, 2=NIGHT,
 11 .
        C
                              3 = OBSCURED
 220.
        C
               IOPN
                              POINTS TO TERRAIN TYPE 1=OPEN, 2=CLOSED
        C
 2 30.
               *K27
                              POINTER FROM MOVEMENT RATE FILE
 247.
        C
                              POINTER FROM DETECTION FILE
               MK 20
 250.
        C
               BMYRTIA BI
                              MOVEMENT RATE FOR BLUE FORCE BASED ON
        C
                              HEAPON CATEGORY A (1:DISMOUNTED,
 260.
        C
                              2 -MORTARS, 3-LIGHT, 4-HLAVY) AND
 27c.
 580.
        C
                              TERRAIN TYPE B 11=OPEN. 2=CLOSEDI
        C
                              MOVEMENT RATE FOR RED FORCE BASED ON
 290.
               RMVFT (A.81
                              REAPON CATEGORY A ISEE ABOVE)
        C
 300.
                              BLUE WEAPON DETECT TIMES AGAINST PED
 310.
        C
               POICT (1 '7'K)
                              TARGETS BASED ON TARGET EXPOSURE I
 320.
        C
 33 .
        €
                              11=VEHICLE EXPOSED, 2=VLHICLE DEFILADE,
                              13=SOLDIER EXPOSED, 4=SOLDIER DEFILABEL,
 340.
        C
 350.
        C
                              BLUE WEAPON SENSOR B 11-EYE. 2-OPTICAL
                              SIGHT, 3=THERMAL SIGHT, 4=IMAGE INTEN-
        C
 360.
 371.
        C
                              SIFIERI, AND RANGE BAND K 10=1-200.
 38C.
        C
                              2:200-400, 3:400-600, 4:600-600,
 390.
        C
                              5 -800 - 10001
 400.
        C
                              RED HEAPON DETECT TIMES AGAINST BLUE
               ROTCT (I.J.K)
                              TARGETS BASED ON TARGET EXPOSURE 1.
 41 %
        C
 42 C.
        C
                              RED WEAPON SENSOR B. AND RANGE BAND K
        C
                              I TEE ABOVE I
 430.
        C
 44C.
 450.
        C
 46 .
               DIMENSION BHVRT (4,2), MVRT (4,2), BDTCT (4,4,5), RDTCT (4,4,5)
        C
 47C.
 481 .
        C
 491.
        C
               SELECT POINTER TO PROPER MOVEMENT RATE
 5(0.
        C
 510.
                 DEFINE FILE 2716,8,U,K271,2013U,16,U,K201
 (2C.
                 K27=110FN-33+2+1
 530.
                 READ 427 427144BHVRT 41, J1, 1=1, 41, J=1,21
 54 .
                 READ (27 %27) ((RMVRT (],J),J=1,4),J=1,2)
 550.
        C
               SELECT POINTER TO PROPER DETECTION FILE
        C
 561.
 570.
          1
                 K2U=4 IOB S-11 +10+1
 58C.
                 0.0 10 K=1.5
                   READ 120 "K2C114BDTCT41, J, K1, I=1, 41, J=1, 41
 590.
 6r 0 .
           U
                 CONTINUE
 (1".
 620.
                 DO 20 K=1.5
 63D.
                   READ 120 K263 (4RDTCT11, J.K), 1=1,41, J=1,41
 640.
           26
                 CONTINUE
 £5 .
 té l'•
               CL05E (2u)
 670.
               CLOSE 1271
 680.
               KK27=K27
                                         3-48
```

## SIFIED

690.	KK27=K20 Return		
700.			
73 `•	DEBUG SUBCHK		
72 *•	41 1		
730.	r ND		

# N 99 18ANK 219 DEANK

. . . . . .

```
DIAMPUBLISH . MVRT
   04/61/82-10:33(0,)
        100.
        C
 110.
        r
 120.
 13".
        C
               SUBROUTINE MURT (XOUNTH, XDFAT, XWDRW, TRNTP, XCHR, XWPN,
 140.
                                XMURI.XWPMVR3
 150.
 16D.
        C
               THIS SUBROUTINE DETERMINES XWPMVR11.J1. THE MOVEMENT RATES
 175.
        C
                 FOR X FORCE WEAPON TYPE I IN TACTICAL MODE J=1.2
        C
 18(.
 190.
         C
                                                   1=NOT IN OVERWATCH.
                             INDEX FOR X FORCE:
         C
               HTWVOX
 200.
                             2= IN OVERWATCH
         C
 21 %
                                                   J=DEFENSE . 2=OFFENSE
                             INDEX FOR X FORCE:
         C
               XDFAT
 220.
                             INDEX FOR X FORCE: 1=ENGAGE, 2=WITHDRAW
         C
               XMORM
 230.
                             CATEGORY FOR X FORCE WEAPON TYPE 1:
         C
               X CHR (1,4)
 240.
                             1=DISMOUNTED, 2=MORTARS, 3=LIGHT, 4=HEAVY
         C
 250.
                             NUMBER OF X FORCE WEAPONS IN TACTICAL
               II+L,IIN9WK
         C
 260.
                             MODE J=1.2
         C
 270.
                             MOVEMENT RATE FOR X FORCE BASED ON:
               XMVRT (A .B)
         C
 28 C.
                             ATHEAPON CATEGORY, BETERHAIN TYPE
         C
  290.
                              INDEX FOR TERRAIN TYPE: 1=OPEN, 2=CLOSE
         C
               TENTP
  300.
  31 1 .
         C
         C
  32 C.
                           XCHR (10,5), XMPN (10,3), XMVR T (4,2), XMPMVR (10,2)
               DIMENSION
  330.
  340.
         C
         C
  350.
                IFIXHDRW.EQ. ?) THEN
  36℃•
         1
                  VAR = -1
  37C.
                ELSE IF INDFAT. EG. 11 THEN
  38 C.
                  WAR = D
  39C.
                ELSE
  400.
                  VAR = 1
  410.
                END IF
  425.
         C
  430.
                00 1C J=1.2
  44 D.
                  00 20 I=1.10
  45 C.
                    IFIXWPN41. J+11. GT. D) THEN
  46 C.
                      XWPMVR41.J3 = XMVRT4XCHR41,43,TRNTP3 + VAR
  470.
  48 .
                      AMPMARII.JI = E
  490.
                    END IF
  500.
          20
                  CONTINUE
  51'.
          10
                CONTINUE
  52 . .
          C
  531.
                LO 36 1=1,10
  540.
                   IF ( XCHR ( I. 4) . EQ . 4) THEN
  55C.
                     IFEXERNET. 31. GT. GT THEN
  560.
                       IF (XOVWTH.EQ. 2) THEN
   570.
                         XWPMVR41,21 = 0
   58 F.
                       END IF
   590.
                     END IF
   600.
                   ELSE IF ! XCHR ( I , 4 ) . E Q . 1 ) THEN
   610.
                     IFIXHEN(1,2).GT.O) THEN
   620.
                       xwpmvR(1.1) = C
   63C.
                     END IF
   645.
                   ELSE
   65'.
                   END IF
   661.
                 CONTINUE
          30
   67'.
          C
   68D.
                                             3-50
```

# SIFIED

690.	C		
786.		RETURN	
71'.		DEBUG	SUBCHK
72 7.		AT I	
73n.		END	

N 223 IBANK 55 DBANK

CTETED

```
DIAMPUBLISH .NDIST
RI
     04/01/82-10:3340,1
           C:x本本本本本本本本本本本本本本本本本本本本本本 SUBROUTINE NDIST 本本本本本本本本本本本本本本本本本本本本本本
   100.
   110.
           C
   127.
           €
           C
   130.
                 SUBROUTINE NDISTIDSTBR, XWPN, XCHR, XWPM VR, XSPMDG, DXFXWP1
   140.
   150.
           C
   160.
           C
                 THIS SUBROUTINE RECALCULATES DXFXWP(I,J), THE DISTANCE
                   FROM THE X FORCE CENTROLD TO X FORCE WEAPON TYPE I IN
   170.
           C
           C
                   TACTICAL MODE J=1.2
   180.
   190.
           C
   193.
           C
                 DSTBR
                                DISTANCE BETWEEN RED AND BLUE CENTROIDS
                               NUMBER OF X FORCE TYPE WEAPON TYPE I IN
   200.
           C
                 II+L,IIN9WK
   210.
           C
                                TACTICAL HODE J=1,2
   220.
           C
                               PIVEMENT RATE FOR X FORCE WEAPON TYPE I IN
                 XEPMVR4 I, JI
           C
                                TACTICAL MODE J=1,2
   33C.
   240.
           C
                 XSPHDG41.J1
                                MOVEMENT SUPPRESSION DEGRADATION FOR X
           C
                                FORCE WEAPON TYPE I IN TACTICAL MODE J=1,2
   250.
           C
                                X FORCE WEAPON TYPE I CATEGORIES:
   26U.
                 XCHR41,41
           C
                                DISMOUNTED=1. MORTARS=2. LIGHT=3. HEAVY=4
   270.
   280.
           C
   291.
           C
   300.
                            XWPN(10,31,XWPMVR(10,21,XSFMDG(10,21,
                 DIMENSION
   310.
                1
                             DXFXWP410,21,XCHR410,51
   720.
           ſ
           C
   33 i .
           C
                 CALCULATE MINIMUM (SUPPRESSION X MOVEMENT RATE)
   34 F.
   350.
                   ZMIN = 1000
           1
                   DO 10 J=1.2
   360.
   370.
                      DO 20 3=1.10
   380.
                        IF (XWPN(I,J+1).GT.C) THEN
                          IF (XCHR(1.4).NE.1 .OR. J.NE.1) THEN
   39G.
                             IF4XWPMVR4I,J1.NE.O1 THEN
   409.
   41 C.
                               ZMIN = AMINI(ZHIN, XWPMVR(1, J)*(1-XSPMDG(1, J)))
   420.
                            END IF
   431 .
                          END IF
   44 (.
                        END IF
   451.
           2 D
                      CONTINUE
           10
   46 .
                    CONTINUE
   47".
           C
   480.
                 IF (ZMIN.EQ.1000) THEN
   49B.
                   RETURN
   500.
                 END IF
   511.
           C
   52 ( .
                 CALCULATE NEW DISTANCES
   53C.
                    00 30 J=1,2
   540.
                      DO 41 1=1,10
   55C.
                        IF (XWPN(I,J+1).GT.U) THEN
   560.
                          IF (XCHR (I, 4) . NE . ) . OF . J. NE . 1) THEN
   57°.
                             IF (XWPMVR(1,J).NE.O) THEN
   58C.
                               DxFxwP(I,J) = DxFxwP(I,J) + ZMIN
   591.
                            END 1F
   600.
                          EL SE
   61'.
                             DxfxWP41,J1 = -5999999
   62 !.
                          END IF
   6314
                        ELSE
   647.
                          DXFXWP(1,J) = -9999999
   65C.
                        END IF
           4 (1
                      CONTINUE
   66, °
           3 %
                    CONTINUE
   671.
                                             3-52
```

```
680.
        C
               CHECK FOR OVERRUNNING OPPONENTS
690.
700.
                  DO 50 J=1.2
710.
                    DO 60 I=1,10
                      IFIDXFXMP(I,J).GE.DSTBR) THEN
DXFXMP(I,J) = DSTBR - 10.0
730.
748.
750.
                       END IF
76 0.
                    CONTINUE
        60
770.
        50
                  CONTINUE
786.
        C
790.
               RETURN
               DEBUG SUBCHK
800.
               AT 1
810.
82 f.
               END
```

SIFIED

```
DIAMPUBLISH . NUMTGT
   04/01/82-10:3310.1
        Cosassassassassassassassas SUBROUTINE NUMIGT **************
 100.
 110.
        C
 120.
        C
        C
 1304
 140.
               SUBROUTINE NUMTGT (XYPKW.YWPN.PCYYXZ.YSPFDG.TOTYTG)
 150.
        C
        C
 16 C.
               THIS SUBROUTINE CALCULATES TOTYTGIL.JI. TOTAL Y TARGETS
 1.70.
        C
                 FOR X FORCE WEAPON TYPE I IN TACTICAL MODE J=1,2
 180.
        C
 190.
        C
               TUPNIK.L+13
                                CONTAINS NUMBER OF Y FORCE WEAPON TYPE K
 200.
        C
                                IN TACTICAL MODE L=1.2
 210.
        C
               PCYVXZ4K.N.L)
                                PERCENT OF Y FORCE HEAPON TYPE K IN TACTICAL
 220.
                                MODE L=1,2 VISIBLE TO X FORCE WEAPON TYPE N
        C
 230.
        C
                                OF WHICH N=11,20 ARE IN TACTICAL MODE 2
 240.
        C
                                SINGLE SHOT PROBABILITY OF KILLISSPKI
               IL.H. II HAGYK
 250.
        C
                                OF X FORCE WEAPON TYPE I IN TACTICAL
 260.
        C
                                MODE J=1,2 AGAINST Y FORCE TARGET TYPE M
                                OF WHICH M=11.20 ARE IN TACTICAL MODE 2
 270.
        C
               YSPFD61K,L1
 280.
        C
                                FIRE SUPPRESSION AGAINST Y FORCE
 290.
        C
                                WEAPON TYPE K IN TACTICAL HODE L=1.2
 30D.
        C
 31 9.
        C
 32 Ba
               DIMENSION # #PKW (10, 20, 2), YWPW (10, 3), PC YWXZ (10, 20, 2)
                           YSPF06410,21, TOTYT6410,21
 330.
              1.
 340.
        C
 350.
               Do 10 J=1.2
 36 D.
                 DG 20 I=1.10
 370.
                   DO 30 L=1.2
 380.
                     DO 40 K=1.10
 390.
        C
 400.
                        IF (XYPKW(1.K+1L-11+10.J).GT.O1 THEN
 410.
                          TOTALG(%.J) = PCXAXZ4K,I+(J-1)+10,L) + AMDM(K,L+1)
 42 G.
              1
                            * (1-YSPFD6(K.L)+D.33) + TOTYT6(I.J)
                        END IF
 430.
 99 00
        C
 45 De
        40
                     CONTINUE
 46 D.
                   CONTINUE
        30
 470.
        20
                 CONTINUE
 480.
               CONTINUE
        10
 490.
        C
 500.
               RETURN
 510.
               DEBUG SUBCHK
 520.
               END
```

N 176 IBANK 61 DBANK

```
DIAMPUBLISH . PCTBL
   04/01/82-10:33(0,)
 100.
        11 .
        C
 12 %
1 .
        C
14".
              SUBROUTINE PCTBL (BWDRW, RWDRW, DFRC, PCRVBE, PCRVBW, PCRWVB,
 15 .
             1
                                PCBVRE, PCBVRW, PCBWVR, PCRVBC, PCBVRC1
160.
        C
17:
        C
              THIS SUBROUTINE DETERMINES WHICH TWO OF THE SIX
100.
        C
                VISIBILITY TABLES TO USE IN THE ATTRITION LOOP
15C.
        C
                BASED ON THE VALUE OF XWITHDR AND YWITHDR
 2.0.
        C
21 .
        C
              RMDRM
                               INDEX FOR BLUE FORCE: 1=ENGAGE. 2=WITHDRAW
 220.
       C
              F. DR W
                               INDEX FOR RED FORCE: 1=ENGAGE, 2=WITHDRAW
230.
        C
              DFRC
                               INDEX: 1=BLUE DEFENDS, 2=RED DEFENDS
240.
        C
                               FRACTION OF RED FORCE WEAPON CATEGORY I
              PCRVBEI1,J.KI
2 ". C.
                               VISIBLE TO BLUE FORCE WEAPON CATEGORY J
        C
 260.
        C
                               IN THE KIH RANGE BAND DURING ENGAGEMENT
27C.
        C
              PCBVRE(1,J,K)
                               FRACTION OF BLUE FORCE WEAPON CATEGORY I
 281.
        C
                               VISIBLE TO RED FORCE WEAPON CATEGORY J
 25 :.
        C
                               IN THE KIH RANGE BAND DURING ENGAGEMENT
 3CU.
        £
                               FRACTION OF RED FORCE WEAPON CATEGORY I
              PCK VBW(I,J,K)
 110.
        C
                               VISIBLE TO BLUE FORCE WEAPON CATEGORY J
 72 ...
        C
                               IN THE KTH RANGE BAND DURING BLUE FORCE
 °3 .
        C
                               HITHURAWAL
 34 .
                               FRACTION OF BLUE FORCE WEAPON CATEGORY I
        C
              PCBWVR(I,J.KI
 350.
        1
                               VISIBLE TO RED FORCE WEAPON CATEGORY J
        C
 36 ii.
                               IN THE KTH RANGE BAND DURING BLUE FORCE
 371.
        C
                               WITHDRAWAL
 38.
        C
                               FRACTION OF RED FORCE WEAPON CATEGORY I
              PCRWVB11,J.K1
 390.
        C
                               VISIBLE TO BLUE FORCE WEAPON CATEGORY J
 400.
        C
                               IN THE KTH RANGE BAND DURING RED FORCE
 410.
        Ĺ
                               WITHURAWAL
 421.
        C
              PCBVRW41,J.KI
                               FRACTION OF BLUE FORCE WEAPON CATEGORY I
 431 .
        C
                               VISIBLE TO RED FORCE WEAPON CATEGORY J
        C
 44C.
                               IN THE KIH RANGE BAND DURING RED FORCE
 450.
        C
                               WITHURAWAL
        €
 461.
 47".
        r
 48 .
              UIMENSION PCRVBE14,4,51,PCRVBW14,4,51,PCRWVB14,4,51
 496.
             1.
                          PCB VPE 14 , 4 , 5 3 , PCB VR W 14 , 4 , 5 3 , PCB W VR 14 , 4 , 5 3
 416.
             2.
                          PCRVBC14,4,51,PCBVRC14,4,51
 r 1 .
        C
 121.
        (
 53 .
              IFIBWORW.EQ. 2 . AND. KWDRW.EQ. 21 THEN
 54C.
                IFIDFRC.EQ.1) THEN
 55
        1
                  RWDRW=1
 56 .
                ELSE
 57 .
                   BWDRW:1
 54".
                EHD IF
 55 .
              END IF
 610.
        C
 61 .
              IF IBHDRH.EL.I . AND. RWDRH.EQ.II THEN
 62C.
                DO 10 1=1.4
 EIC.
                   60 20 J=1.4
 64 .
                    DU 40 ME1 ,5
 £5'.
                       PCRVBC(1,J,K)=PCRVBE(1,J,K)
 £6 .
                       PCBVRC(I,J,K)=PCBVRE(I,J,K)
        3€
 67' .
                    CONTINUE
        20
                   CONTINUE
 680.
                                        3-55
```

```
10
                 CONTINUE
690.
700.
       C
              LLSE IF IBNDRW.EQ.21 THEN
710.
                 DO 40 I=1,4
720.
                   DO 58 J=1.4
73C.
740.
                     DO 60 K=1.5
                       PCRVBC(I,J.K)=PCRVBW(I,J.K)
750.
                       PCBVRC (I, J, K) = PCBW VR(I, J, K)
76 0.
77 C.
       60
                     CONTINUE
       50
                   CONTINUE
78C.
790.
       40
                 CONTINUE
.003
       C
81°.
               LLSE
                 DO 70 I=1.4
820.
83D.
                   DO 80 J=1.4
84C.
                     DO 90 K=1.5
85'.
                        PCRVBC41,J,K1=PCRWV841,J,K1
86 r.
                        PCBVRC (I.J.K)=PCBVRW(I.J.K)
87 .
       9 Ü
                     CONTINUE
88 %
       8 ()
                   CONTINUE
                 CONTINUE
890.
        70
970.
               END IF
91 C.
        C
92 0.
               RETURN
               DEBUG SUBCHK
930.
94 D.
               AT 1
               LND
9-0.
```

## N 344 IBANK 87 DEANK

```
SIFIED
```

```
DIAMPUBLISH .PCLPVS
   04/01/82-10:33(0.)
 100.
        C ***************
                                    SUBROUTINE PCHPVS *************
 110-
        C
 125
        C
 13 .
        C
 146.
               SUBROUTINE PCWP VS (XCHR, YLHR, PCX VYC, XYRGBD, PCX VYZ)
 150.
        C
        C
               THIS SUBROUTINE DETERMINES PCXVYZ41.M.JJ. THE FRACTION OF X
 16 .
        C
 170.
                 FORCE WEAPON TYPE I IN TACTICAL MODE J=1.2 VISIBLE TO V
 1 of.
        C
                 FORCE WEAPON TYPE M OF WHICH M=11.28 ARE IN TACTICAL
 19'.
        C
                 MODE 2
 210.
        C
        C
                                WEAPON CATEGORY OF X FORCE WEAPON TYPE I:
 210.
               XCHR(I.4)
 226.
        C
                                DISMOUNTED=1. HORTARS=2. LIGHT=3. HEAVY=4
 230.
        C
                                WEAPON CATEGORY OF Y FORCE WEAPON TYPE K:
               YCHR (K.4)
                                DISMOUNTED=1, MORTARS=2, LIGHT=3, HEAVY=4
 240.
        L
 251.
        C
                                FRACTION OF X FORCE WEAPON CATEGORY A
               PCXVYC(A,B,C)
                                VISIBLE TO Y FORCE WEAPON CATEGORY B
 261.
        C
                                IN RANGE BAND C
 270.
        C
 280.
        C
                                RANGE BANDS FOR X FORCE WEAPON TYPE I IN
               IL.M.IIOGDAYK
                                TACTICAL MODE J=1.2 AGAINST V FORCE WEAPON
 29C.
        C
                                TYPE M OF WHICH M=11.20 ARE IN TACTICAL
 300.
        C
 31. .
        C
                                HODE 2
 320.
        C
 231 .
        C
 34F.
               DIMENSION XCHR (10,5), YCHR (10,5), PCXYYC (4,4,5), XYR6BU (10,20,2)
 35C.
              1.
                           PCXVYZ(10,20,2)
        C
 36C.
 175 .
        C
 385.
               DO 10 J=1,2
        1
 390.
                 DO 20 I=1.10
 4CC.
                   DO 30 L=1.2
 41 .
                     DO 40 K=1.10
 42 .
        C
 43C.
                      IF (X YRGBD (I.K + (L - 1) + 10.J) .EQ. 6) THEN
 44 C.
                        PCXVYZII_{K}+IL-11+10_{I}JI = 0
 45 .
                     ELSE
 46 .
                        PCXYYZ(I,K+(L-1)+10,J) =
 47 -.
                          PCXVYC(XCHRII,43,YCHR(K,43,XYRGBD(I,K+(L-1)+10,J))
              1
 48 -.
                     END IF
 49 .
        C
 5'0.
                     CONTINUE
        40
 51'
        30
                   CONTINUE
 52' .
        20
                 CONTINUE
 53'.
        10
               CONTINUE
 541 .
         C
 55 E.
               RETURN
               DEBUG SUBCHK
 56 .
               41 1
 57' .
               EID
 51 .
```

N 217 IBANK 61 DBANK

SIFTED

```
DIAMPUBLISH .PKIN
     01 /01/82-10:33(0.)
R1
                  SUBROUTINE PKIN (BRPK, RBPK, BCHR, RCHR, IBU, IRD, KK 15, KK 16, NUMB,
   100.
   110.
                 INUMP.IUI
   120.
                  DIMENSION IBU(10), IRD(10), PREC(25), BRPK(10, 10, 5), RBPK(10, 10, 5)
   130.
                 1.BCHR (10.5).RCHR(10.5).BNAHE(10).RNAME(10)
   140.
           C
           C
             ZERO PK ARRAYS
   150.
           C
   160.
   170.
                  DEFINE FILE 151300,26,0,K151,161300,26,U,K161
           CC
   180.
                   PRINT 2002, IU
   190.
           2002
                   FORMAT (1X. "IU
                                    1.151
                   DO 30 I=1,10
   200.
            1
   210.
                  DO 20 J=1.10
   220.
                  LO 10 K=1.5
   23C.
                  BRPK(1, J, K) = -1.0
   240.
                  RBPK(1, J.K)=-1.0
   250.
            10
                  CONTINUE
            20
                  CONTINUE
   261.
                  CONTINUE
   275.
             30
   280.
           C
   290.
           C FILL ARRAY BRPK WITH BLUE VS RED PK
   300.
           C
   310.
                  CO 61 1=1 .NUMB
   32 P.
           C
   33~.
           C
             FIND PROPER BLUE WEAPON ON PK FILE
   346.
   350.
                  *15=51+41BU411-21*5
   360.
                  #16=#15
    370.
   38: .
           C
             READ IN BLUE RECORDS FOR 5 RANGES
           C
   390.
   400 .
                  EO 50 K=1.5
   41 C.
                  1F41U.EQ.11 GO TO 35
   420.
                  hEAD(15 *k15) NAM1, (PREC(L), L=1, 25)
   43C.
                  60 10 37
    440.
             35
                  READ(16 'K16 )NAM1, (PREC(L), L=1, 25)
   450.
           C
   461.
           C SELECT PROPER RED WEAPON VULNERABILITIES
           C
   470.
   480.
           CC
                   PRINT 2001, NAM1, (PREC(L), L=1, 14)
   490.
           2001
                   FORMAT (1X, A4, 14F5.2)
    500.
           37
                  DO 40 J=1.NUMR
    511.
                  IPT=IRD (J)
    520.
                  IF (PREC (IPT) NE .G.O) BRPK(I,J,K1=PREC (IPT)
   531.
             4 C
                  CONTINUE
   54 C.
             50
                  CONTINUE
    55 ...
             60
                   CONTINUE
    560
    577.
           C FILL ARRAY RBPK WITH RED VS BLUE
    581 .
           C
    590.
                  LO 90 I=1.NUMR
    600.
    61 11.
           C
              FIND PROPER RED WEAFON ON PK FILE
    £2'.
            C
    £30.
                  M15=176 + (] KD (111-11#5
    640.
                  #16 =K15
    650.
           C READ IN RED RECORDS FOR 5 RANGES
    66 0.
   67C.
                  DO 8' K=1,5
   680.
                  JF 11U.EQ.11 60 10 65
```

3-58

```
691.
                READ(15 %) 151 NAM1 (PREC(L) L= 1.25)
 700.
                GO TO 67
 711.
          €5
                READ(16 * 416) NAM1 . (PREC(L) . L= 1.25)
 720.
         C
 73".
         C SELECT PROPER BLUE WEAPON VULNERABILITIES
 74' .
 750.
         67
               DG 70 J=1.NUMB
 76 .
                1P1=18U(J)
 770.
                IF (PREC(IPT).NE.O) RBPK(1, J.K)=PREC(IPT)
 78 .
          70
                 CONTINUE
 751 .
          8C
                 CONTINUE
 er a.
          90
                CONTINUE
 .'13
         r
 82 ' .
        C LUAD BLUE WEAPON CHARACTERISTICS
 231.
 84 à.
                DO 100 IFI NUMB
               K15=18U411
 85C.
 "EC.
                +16=H15
 87".
                IF (IU.E 4.1) GO TO 95
 88 0.
                READ(15 'K15 ) BNAME(I), ISEN, BCHR(I, 2), BCHR(I, 3), ICAT, BCHR(I, 5)
 895.
                60 10 97
                 HEAD (16 ' 16) BNAME (11. I SEN. BCHR (1.2) BCHR (1.3). ICAT. BCHR (1.5)
 SCO.
          95
 910.
          97
                  BCHRII, 11=1SEN
 92 be
                BCHR (1,4)= ICAT
 93 .
         CC
                PRINT 1000, BNAME(13, (BCHR(1,J),J=1,5)
 54 L.
                 LONTINUE
          100
 95'.
         C
 96 .
         C LOAD HED WEAPON CHARACTERISTICS
 97".
 980.
                DO 2(L 1=1 NUMR
 99 C.
                K15=1RD (11)+25
1000.
                *16=K15
1710.
                1+41U.EG.11 GO TO 15C
                READ(15 *K15) RNAME(11, ISEN, RCHR(1, 21, RCHR(1, 31, ICAT, RCHR(1, 51
1020.
1030.
                6. TO 160
                FEAD(16 %16) FNAME(1), ISEN, RCHR(1, 2), RCHR(1, 3), ICAT, RCHR(1, 5)
          150
104C.
                RCHR(I,1)=ISEN
1050.
          16.
106 .
                RCHR(1,4):1CAT
                PRINT 1000, RNAME(I), (RCHR(I,J),J=1,5)
1070.
         CE
1'80.
          200
                 CONTINUE
1030.
                CL0 'E 1151
1100.
                CLOSE (16)
111 .
                 KK15=K15
          10LC FORMATTIX, A4,5F13.31
112C.
11 %.
                KK1: =K16
                RETURN
114 .
1156.
         C
                DEBUG SUBCHK SUBTRACE
                41 1
116 .
         C
117 .
                Etib
```

N 311 IBANK 316 DEANK

```
DIAMPUBLISH .PK .P
Ri
     04/01/82-10:33/0.1
          100.
   110.
   121.
          C
   13C.
          C
   140.
                SUBROUTINE PHWP (XYPK . XYRGBO . XYPKWP)
   150.
          C
   160.
          C
                THIS SUBROUTINE DETERMINES XYPKWP(I,M.J). THE SSPK FOR X
   170.
          C
                  FORCE WEAPON TYPE I IN TACTICAL MODE J=1.2 AGAINST Y FORCE
   180.
          C
                   TARGET TYPE M OF WHICH M=11420 ARE IN TACTICAL MODE 2
   191.
          C
   200.
          C
                XYPK(I.K.C)
                                 SSPK FOR X FORCE WEAPON TYPE I VERSUS Y
   210.
          C
                                 FORCE TARGET TYPE K IN RANGE BAND C
   220.
          C
                XYRGBD(I,M,J)
                                  RANGE BAND FOR X FORCE WEAPON TYPE I IN
   230.
          C
                                  TACTICAL MODE J=1,2 AGAINST Y FORCE TARGET
   240.
          C
                                  TYPE M OF WHICH M=11,2D ARE TACTICAL MODE 2
   255.
          C
   260.
          C
   270.
                DIMENSION XYPK (10, 10, 51, XYRGBD (10, 20, 2), XYPK WP(10, 20, 2)
   28C.
          C
   29 F.
          C
   300.
          1
                00 10 J=1,2
   310.
                   00 20 1=1.10
   320.
                     DO 30 L=1.2
   330.
                       DO 40 K=1.10
   34 ° .
          C
   35C.
                         IF (XYRGBO (I , K+(L-1)+10, J) .EQ. 6) THEN
   360.
                           V = ( L. 01 + (L - 1) + N. [ 19 w | NYPKX
   37 C.
                         ELSE
   38 %
                           XYPRWP(I,K+(L-1)+10,J)=XYPK(I,K,XYRG(D(I,K+(L-1)+10,J))
                         E!D IF
   39 D.
   41 0.
          C
   41 ' .
          40
                       CONTINUE
   42 f .
          30
                     CONTINUE
   431.
          20
                   CONTINUE
44 €.
                 CONTINUE
          10
   45 %
          C
   466.
                 RETURN
   47 .
                 DEBUG SUBCHK
   46 · .
                 AT 1
   495.
                 END
```

N 166 IBANK 45 DBANK

CIETEN

```
DIAMPUBLISH REMNT
     04 /0 1/ 87 -10:33 (0.1
R1
   100.
           C ****** ** ***********
                                      SUBROUTINE REMNT
                                                          **********
   11 6.
           C
   125.
          C
   130.
          C
   140.
                 SUBROUTINE REMNTIXCHR, XWPN, XDMMAX, XDMV, XDMRTO, XNUMDM,
   150.
                             DXFXWP1
   160.
           C
   170.
          C
                 THIS SUBROUTINE MOUNTS DISHOUNTED TROOPS FOR X FORCE
   180.
           C
   190.
           C
                 MOTOFK
                                 TOTAL NUMBER OF DISMOUNTED TROOPS
   200.
          C
                 DMTOFK
                                 TOTAL NUMBER OF TROOP CARRIERS
   210.
           C
                                 CATEGORY OF X FORCE WEAPON TYPE I:
                 X CHR (1.4)
   22 0.
           C
                                 DISMOUNTED=1, MORTARS=2, LIGHT=3, HEAVY=4
   230.
           C
                 II+L.IINGWX
                                 NUMBER OF X FORCE WEAPON TYPE I IN TACTICAL
   240.
           C
                                 MODE J: 1.2
   250.
           C
                 KAMMOK
                                 MAXINUM NUMBER OF TROOPS ALLOWED IN TROOP CARRIER
          C
   260.
                 VHOX
                                 INDEX FOR X FORCE: 1=D1SMOUNTED. 2=MOUNTED
   270.
           C
                 XUMRTO
                                 RATIO OF DISMOUNTED TROUPS TO CARRIERS
           C
   280.
                 MOMUNK
                                 NUMBER OF THOOPS THAT MOUNT PER CARRIER
   290.
           C
                 DXFXWP(1,J)
                                 DISTANCE FROM X FORCE CENTROID TO X FORCE
   300.
           C
                                 WEAPON TYPE 1 IN TACTICAL MODE J=1,2
   310.
           Ċ
   321..
           C
   330.
                 EIMENSION XCHR (10,51, DXFXWP(10,21, XWPN(10,3)
   340.
           C
   351 .
           C
   360.
                 IF (XDMR TO.LE.D) THEN
   37G.
           C
                   DO NOT REMOUNT
   385.
                   RETURN
   39 .
           C
   400.
                 ELSE IF (XDMR TO. LE. XDMMAX) THEN
   410.
           1
                    DO 10 1=1.10
   420.
                      IF (XCHR (I, 4).EQ.1) THEN
   43C.
                        IFIXWPN(1,3).GT.D) THEN
   441.
                          XWPN41,13 = XWPN41,31
   4511.
                          XWPN(I,3) = 0
   46C.
                                            -9999999
                          DXFXWP(I.1)
                                        Ξ
   47G.
                          DXFXWP11,21
                                        Ξ
                                            -9999999
   48 ".
                        END IF
   491.
                      END IF
   500.
                   CONTINUE
           10
   511.
                   XNUMDM = XDMRTO
   52 ...
           C
   531 .
                 ELSE
   54 C.
                    00 20 1=1,10
   550.
                      IFIXCHR41,41.EQ.11 THEN
   560.
                        IF(XHPN(I,3).GT.D) THEN
   570.
                          XWPN(1,2) = XWPN(1,3) * XDMMAX/XDMRTO
                          XWPN(1,3) = XWPN(1,3) - XWPN(1,2)
   58 C.
   591'.
                          DXFXWP11,11 = -99999999
   600.
                        END IF
   611 .-
                      END IF
   625.
           20
                   CONTINUE
   €3 C.
                   XNUMDH = XDMMAX
   64".
                 END IF
   65 11.
           C
   66 G:
           C
                 CHANGE TROOP CARRIER MODE
   670.
          25
                   00 30 1=1,10
   680.
                      IFIXCHRII, 41.EQ.31 THEN
```

3-62

```
SIFIED
   690.
                       IF (XWPN(1,3).GE.O) THEN
   700.
                       xwpn(1,2) = xwpn(1,3)
   710.
                         XWPN11,31 = 0
   72 %
                         DXFXWP(1,1) = DXFXWP(1,2)
   73: .
                         DxFxwP(1,2) = -99999999
   740.
                       END IF
   75 .
                     END IF
   76 '·
                   CONTINUE
          30
   77 ..
          C
   780.
                 XOMV = 1
   79 ".
          C
   atio.
                RETURN
```

DEBUG SUBCHK

E TA

N 321 IBANK 43 DBANK

£1:.

83 .

```
DIAMPUBLISH . REPRT
   04/01/82-10:33(0,1
 100.
        C 2222224 ***********
                                    SUBROUTINE REPRI *************
 110.
 12r.
         C
 130.
         C
 14 %
               SUBROUTINE REPRICIGANTMORBKYLSOBRKYLSOBNUMORNUMOBDE ADO
 150.
              1
                                   RDEAD . BWPN . RWPM . BDSNG . RDSNG . BWDRW . RWDRW .
 160.
              1
                                   BRDSUM, RRDSUM, DSTMINE
 171.
         C
 18€.
        C
               THIS SUBROUTINE PRINTS A DIAM BATTLE STATUS REPORT.
         C

    REPORT LISTS THE KILLER VICTIM SCOREBOARDS AND ALLOWS

 190.
 200.
         C
                  THE GAMER TO STOP THE GAME. THE FOLLOWING VARIABLES
 210.
         C
                  ARE INPUT
         C
 22 40
 2314
        C
               IGAMTM
                              GAME TIME IN MINUTES
         C
 24".
               RBKVLS11.J1
                              LOSSES OF BLUE WEAPON TYPE J FROM RED WEAFON
 250.
         C
                              TYPE I
 26D.
         C
               BRKVLS11,J1
                              LOSSES OF RED WEAPON TYPE J FROM BLUE WEAPON
 270.
         C
                              TYPE I
 28 ( .
         C
               BNUM
                              NUMBER OF BLUE WEAPON SYSTEM TYPES
 290.
        C
                              NUMBER OF RED WEAPON SYSTEM TYPES
               RNUM
         C
 300.
               BOE AD 11 , J1
                              TOTAL NUMBER OF BLUE WEAPON TYPE I IN TACTICAL
                              MODE J=1,2
 31 ...
         C
 320.
         C
               RDEAD (1.J)
                              TOTAL NUMBER OF RED WEAPON TYPE 1 IN TACTICAL
         C
 330.
                              MODE J=1,2
        C
 340.
               BUSNE
                              BLUE FORCE INDEX: ENGAGING=1, DISENGAGE=2
 351 .
         C
                              RED FORCE INDEX: ENGAGING=1, DISENGAGE=2
               ROSNG
                              NUMBER OF BLUE FORCE WEAPON TYPE 1 IN TACTICAL
 36 D.
         C
               BaPN(I,J+))
 37C.
         C
                              MODE J=1.2
         C
 380.
               RWPN(I,J+1)
                              NUMBER OF RED FORCE WEAPON TYPE 1 IN TACTICAL
         C
                              MODE J=1,2
 391 .
         C
 400.
               BWDRW
                              INDEX FOR BLUE FORCE: ENGAGING=1, AITHDRAWING=2
 410a
         C
               RWDRW
                              INDEX FOR RED FORCE: ENGAGING=1, WITHDRAWING=2
 42 C.
         C
               DSIMIN
                              MINIMUM DISTANCE BETWEEN OPPOSING WEAPONS
 430.
         C
         C
 441.
 45 C.
               COMMON/REED/JDAY1,XINX(4),ICARD(20),IHY,IHN,IH6,IHYES,IHNO
 46C.
         C
 470.
               DIMENSION
                            RBKVLS (12, 131, BRKVLS (12, 131, BDE AD (10, 21, RDE AD (10, 21,
 480.
              1
                           DEAD (10), IAM(2), BWPN (10, 3), RWPN (10, 3), IBH(10),
 45.0
              1
                            IRH ( 101 , B & O S UM ( 10 , 21 , R F D S UM ( 10 , 2 )
 50 D s
         C
 516.
         ſ
 5211.
               PRINT 1000, IGAMTM
               PRINT 1010, DSTMIN
 53C.
 54 C.
               I BNUM = BNUM
 550.
               IRNUMERNUM
 560.
               IAMILE 'ARTY'
 570.
               IAHEZI: "HINE"
 580.
         C
 59 €.
         C
               INTEGERIZE BLUE JIFFY POINTERS
 600.
                  DO 10 1=1.IBNUM
 610.
                    IBH (I) = BWFN(I.1)
         10
 620.
                  CONTINUE
 63r.
         C
        C
 64 C.
               INTEGERIZE RED JIFFY POINTERS
 65 C.
                  DO 20 1=1.IRNUM
 66 C.
                    IRH4I1 = RWPN4I.11
        20
 67r.
                  CONTINUE
 680.
```

i "na ma nikedistra"

3-64

```
SIFIED
   690.
          C
                 PRINT BLUE KILLER/RED VICTIM INFORMATION
   70 C.
          C
                   PRINT HEADINGS
   71".
                     PRINT 2000
   72 ..
                     PRINT 3000, (1RH(1),1=1,1RNUM)
   730.
          C
                   PRINT RED DIRECT FIRE LOSSES AND ROUNDS FIRED
   741.
                     DO 3C I=1, IENUM
   75 .
                       PRINT 4000, IBH(I), (BRX VLS(I,J),J=1,IRNUH)
   76 C.
                       PRINT 4005, (BRDSUM(1,K),K=1,2)
   770.
          30
                     CONTINUE
   78 ".
          C
                   PRINT RED ARTILLERY AND MINE LOSSES
   79 .
                     DO 40 I=1.2
   6CC.
                       PRINT 4010, IAM(1), (BRKVLS(1+10,J),J=1, IRNUM)
   >10.
          40
                     CONTINUE
                   SUM DEAD REDS AND PRINT SUM
   82 ...
          C
   837.
                     DO 50 1=1,1PNUM
                       DEAD(1) = RDEAD(1-1) + RDEAD(1-2)
   840.
          5 C
                     CONTINUE
   85
                     PRINT 5000, IDEADII), I= 1, IRNUM)
   860.
   2711.
          C
   . 39
                 FRINT RED KILLER/BLUE VICTIM INFORMATION
          C
   89U.
          C
                   PRINT HEADINGS
                     PRINT 6000
   900.
                     PRINT 3000, (IBH(I), I=1, IBN UM)
   910.
   921 .
                   PRINT BLUE DIRECT FIRE LOSSES AND ROUNDS FIRED
          C
   930.
                     DO 66 1=1,1RNUM
                       PRINT 4000, IRH(I), (RBK VLS(I, J), J=1, IBNUM)
   94 D.
                       PRINT 4005, 4RRDSUM41,K1,K=1,21
   95 .
          60
                     CONTINUE
   96 i .
   970.
                   PRINT BLUE ARTILLERY AND MINE LOSSES
          C
   58C.
                     00 70 1:1.2
   990.
                       PRINT 4010, IAM(I), (RBKVLS(I+10,J),J=1,IBNUM)
  1 00.
          70
                     CONTINUE
  1 71 0.
                   SUM DEAD BLUES AND PRINT SUM
          C
                     DO 86 1=1,18NUM
  1 1)2 0.
                       DEAD(1) = BDEAD(1,1) + BDEAD(1,2)
  103C.
          8 C
  1046.
                     CONTINUE
  1:50.
                     PRINT 5000, (DEAD(I),I=1,IBNUM)
  1 60.
          C
  1 '70.
          C
                 QUESTION GAMER FOR DISENGAGEMENT
  1080.
                   IF(BWDRW.EQ.1 .AND. RWDRW.EQ.11 THEN
  1090.
             96
                     PRINT 7000
                     CALL PEED4
  11 0.
  1111'.
                     IOUT - XINX (1)
                     IF(10LT.LT.1 .OR. 10UT.GT.31 THEN
  1120.
  1130.
                       50 10 90
  114'.
                     ELSE IF (TOUT.EQ.2) THEN
                       BOSNG = 2
  115.
                     ELSE IFIIOUT.EQ.3) THEN
  1160.
  117C.
                       ROSNG = :
                     ELSE
  1181.
                       BDSNG = 1
  119".
                       RUSNG = 1
  1200.
  1210.
                     END IF
  102 .
                   END IF
  123 .
          1000 FORMAT(1x. "DIAM INFANTRY STATUS REPORT", 10x,
  124 C.
                1 BATTLE TIME IS , 13, 2x, "HINUTES"
  125%
                 FORMATILE, MINIMUM DISTANCE BETWEEN OPPOSING WEAPONS IS .
          1016
  1260.
                1 F6.1, METERS 1
  1270.
                FURMAT(1x,//,2x, BLUE ,23x, RED LOSSES ,25x, BLUE RNDS,
          2000
  1281.
```

1 /,1x, KILLER\*, 52x, PRIMARY/SECONDARY\*)

1290.

```
SIFIED
```

```
3000 FORMAT(6x,10(16))
1300.
         4000 FORMAT(3X,14,12F6:11
1310.
         4005 FORMAT155x,2F12.11
1315.
       . 401C
              FORHAT13X, A4, 10F6.11
1 32 0.
      5000 FORMATIIX, /, 2X, "TOTAL", 10F6 .11
1 330.
         6000 FORMATCIX, // 2x, RED . 23x, BLUE LOSSES . 23x, RED RNUS.
1340.
              1 / 1x , "KILLER", 52 x , "PRIMARY / SECONDARY " }
1350.
         7000 FORMATO// , ZX , "DO YOU WISH TO WITHDRAW FORCES? " 5
1360.
              1º1=NO .2=BLUE WITHDRAWS 3=RED WITHDRAWS **
1370.
         8000 FORMAT(II)
1380.
1390.
               RETURN
1400.
               DEBUG SUBCHK
 141 11.
               A7 1
 1 42 0.
               END
 1430.
```

N 334 IBANK 621 DBANK 30 COMMON

## SIFIED

```
DIAMPUBLISH .RNDCK
    04/01/82-10:33(6,1
RI
   10C.
          C******************** SUBROUTINE RNDCK
                                                        - 《古古古帝本本本本本本本本文本本》 水木本本本本
   110.
   17 %
          C
   13.
          C
   14".
                 SUBROUTINE RNDCKINHPN.XCHR.YCHR.XNUM.YNUM.XRDFR.XAMO.XRDSUH)
   150.
          •
          C
   161%
                 THIS SUBROUTINE COMPARES THE AMOUNT OF ROUNDS TO FIRE WITH
   170.
          C
                   THE NUMBER OF ROUNDS AVAILABLE TO FIRE. IF ROUNDS FIRED
   180.
          C
                   FROM ARDER ARE GREATER THAN THE ROUNDS AVAILABLE TO FIRE
   190.
          C
                   IN XAMO, THEN THE ROUNDS ARE REAPPORTIONED SO THAT THE
   200.
          C
                   TOTAL NUMBER OF ROUNDS TO FIRE DOES NOT EXCEED ONE FOURTH
   210.
          C
                   OF THE CURRENTLY AVAILABLE ROUNDS.
   ~2 . .
          C
   231.
                 FUR WEAPON SYSTEMS THAT CARRY RIFLES AS SECONDARY WEAPONS,
          C
   24G.
          C
                   THE NUMBER OF ROUNDS FOR RIFLES IS INCREASED TO REFLECT
   250.
          C
                   FIFIE FIRING
   261.
          C
   270.
          C
                                NUMBER OF X FORCE WEAPON TYPE I IN TACTICAL
                 IL, IINGHK
   280.
          C
                                MODE J=7.3
   290.
          C
                                AMMUNITION FOR X FORCE WEAPON TYPE I OF WHICH
                 IL, []OMAK
   300.
          C
                                J=7 IS FOR THE PRINCIPAL WEAPON, AND J=2 IS
   31 .
          ľ
                                FOR RIFLES. THIS APRAY CONTAINS THE AVERAGE OF
   320.
          C
                                AMMO AVAILABLE PER WEAPON
          C
   33G.
                 XCHP(I,4)
                                WEAPON CATEGORY FOR X FORCE WEAPON TYPE 1:
   34C.
          C
                                DISHOUNTED: 1, HORTARS: 2, LIGHT: 3, HEAVY: 4
   35C.
          C
                 YCH4(1,4)
                                WEAPON CATEGORY FOR Y FORCE WEAPON TYPE 1:
   36 ° .
          C
                                DISHOUNTED=1, HORTARS=2, LIGHT=3, HEAVY=4
   370.
          C
                 XCHR41,51
                                TIME TO AIM, RELOAD, AND FIRE FOR X FORCE
   381.
          C
                                WEAPON TYPE I
   390.
                                ROUNDS TO FIRE FOR X FORCE WEAPON TYPE
          C
                 XKDFR (I.J.K)
   40 Ca
          C
                                I IN TACTICAL MODE K=1.2 AGAINST TARGETS J OF
   41 C.
          C
                                WHICH J=11,20 ARE TACTICAL KODE 2
   42 C.
          C
                                TOTAL ROUNDS FIRED FOR WEAPON TYPE I OF
                 XRDSURII,JI
   431.
          C
                                WHICH J=1 IS PRINCIPAL AMMUNTION AND J=2
   447 .
                                IS RIFLE AMMUNITION
          r
   45 .
          Ç
   4t .
          C
   475.
                 Ulmension XAMO(10,2), XWPN(10,3), YCHR(10,5), XCHR(10,5)
                ١,
   420.
                              xRDFR110,20,21, xRDSUM110,21
   49' .
          C
   5 '0.
          C
   517.
                 IXNUM "X NUM
          1
   521.
                 I YNUM = YNUM
   53".
                 THIS LOOP REAPPORTIONS ALL NON-RIFLE ROUNDS FOR EACH FIRER
                 DO 100 1=1.1xNUH
   54C.
   55C.
                 SIM TOTAL ROUNDS FIRED AT ALL TARGETS
   56: .
                 IF (XWPN 41, 2). GT. D. D) GO TO 5
   570.
                 IF (XNPN (1, 3).LE.O.O) GO TO 100
   5 · ;
           5
                 SUM TO. D
   5900
          C
   6 0.
                 SET RIFLE FLAG
          Ĺ
   £1 '.
                 IKIFLE=0
   62 De
                 IF (XAHO (I, 2) . NE . O . O ) IRIFLE = 1
   63C.
          C
                 RUN THROUGH ALL TARGETS FOR NON-RIFLE FIRING
   646.
                 DU ZE J=1,IYNUM
   65.℃
          C
                 CHECK FOR PERSONNEL TYPE TARGET. IF PERSON AND RIFLE
                 ROUNDS AVAILABLE THEN MUST FIRE RIFLE
   661°
          C
   67C.
                 IFIYCHRIJ,41.EQ.1 .AND. IRIFLE.EQ.11 GO TO 20
                 SUM TOTAL ROUNDS FIRED AT THIS TARGET BY FIRERS IN
           C
```

The work of the safe of

3~67

686.

```
- SIFIED
    690.
                  TACTICAL MODES 1 AND 2
                  DG 10 K=1.2
    700.
    710.
                     SUM = KRDFR(1,J,K)+XFDFR(1,J+10,K) + SUM
    72 P.
            10
                  CONTINUE
    7360
            20
                  CONTINUE
    740.
            C
    7504
            C
                  COMPARE NUMBER OF ROUNDS FIRED WITH NUMBER AVAILABLE.
    76C.
            C
                  FIRST TOTAL NUMBER OF WEAPONS ALIVE TO FIRE
    770.
                  TWPN = XWPN41.21
                  IF (XNPN \{1,3\} GT \{0,0\} TWPN = TWPN \{1,3\}
    780.
            C
    790.
    8C0 4
            C
    81 0.
            C
                  COMPUTE THE NUMBER OF NON-RIFLE ROUNDS AVAILABLE
            C
    820.
                  PER WEAPON
    830.
                  AVL = TWPN + XAMO(I.I) + 0.25
                  IF NUMBER FIRED LESS THAN AVAILABLE REDUCE ROUNDS
    86 C.
            C
    87C.
                  IFISUM-LE.AVLI GO TO 50
            C
    38C.
            C
                  REAPPORTION THE NUMBER AVAILABLE OVER ALL FIRED
    69 %
    900.
                  DO 40 JEL INNUM
    91 r.
            C
                  IGNURE PERSONNEL IF RIFLES ARE AVAILABLE
    920.
                   IF (YCHRIJ, 4).EQ.1 .AND. IRIFLE.EQ.11 GO TO 40
    930.
                     DO 30 K=1.2
                     XRDFR(1,J,K) = XRDFR(1,J,K)/SUM * AVL
    59C.
    550.
                     XRDFR 41, J+10, K) = XRDFR41, J+10, K1/SUM
    9850
            30
                     CONTINUE
            0.0
                     CONTINUE
    97 %
    980.
            C
                  UPDATE XAMO ARRAY
    99 (1.
            C
                  XAMO{1.11} = XAMO{1.11} * C.75
   1000.
   1010.
                  G(1 TO 55
            C
                  COMPUTE THE AVERAGE NUMBER OF ROUNDS LOST
   102G.
   1030.
            50
                  XAMO(1,1) = XAMO(1,1) - SUM/TWPN
   1050.
            C
   1060.
            C
                   IF NO RIFLE TOTAL ROUNDS
   1470.
            55
                   IF (IRIFLE.EQ.D) GO TO 94
   1080.
            C
                  CALCULATE RIFLE SHOTS AND SUN ALL SHOTS
   1090.
                  SUM = 0.0
                  DO 70 J=1.14NUM
   1100.
   1110.
                     IFIVEHRIJ.41 .NE.1.UI GO TO 70
                     DO 60 K=1.2
   ì120°
   1130.
                       SUH = XRDFR(I,J,K) + XRDFR(I,J+10,K) + SUM
   1140.
            6 C
                     CONTINUE
   115(.
            70
                  CONTINUE
   116".
            C
   11760
                  IF ISUM. EC. D. G) GO TO 94
   1180.
            C
                  COMPUTE NUMBER OF HEAPONS AVAILABLE
   1190a
                   TIPN = XMPN(1.2)
   1200.
                  IF (XHPN 41, 3).GT.O) TEPN= TWPN + XWPN (1, 3)
   1210.
            C
   12210
            €
                   COMPUTE NUMBER OF RIFLE ROUNDS FIRED TAKE AIM
            €
   1230.
                  FIRE RELOAD TIME FOR THIS PRINCIPAL WEAPON ARE
            C
   1240.
                  DIVIDED BY 3 SECONDS FOR AIM, FIRE, AND RELOAD
   1251%
                  FOR RIFLE
                   AVI = XAHO(1,21 * TWPN * 0.25
   1260.
   1290.
                   IF (SUM * XCHR41, 51/3.0 . LT. AVL 1 AVL=SUM * XCHR41, 51/3.0
   1 300%
            C
```

C

C

131 °C.

133 %

1340.

SIFIED

3-68

REAPPORTION RIFLE FIRINGS

CHECK FOR PERSONNEL TARGET

IF (YCHR) 1,41. NE. 11 GO TO 9E

DO 90 J=1, I YNUM

```
SIFIED
  1350.
                 DU 80 K=1.2
  1360.
                 XRDFR(I-,J,K) = XRDFR(I,J,K)/SUM # AVL
  1 370.
                 XRDFR(I,J+10,K) = XRDFR(I,J+10,K)/SUM * AVL
  1380.
          80
                 CONTINUE
  1391.
          90
                 CONTINUE
  1400.
                 XAMO41,21 = XAMO41,21 - AVL/TWPN
  1410.
  142 %
          C
                 SUM ROUNDS FIRED
  1430.
          54
                   DO 95 J=1.IYNUH
  1440.
                     K=1
  145G.
                     IFIIRIFLE.E U.1 .AND. YCHRIJ,41.EQ.11 K=2
  146 C.
                       xrosuh(I,k) = xrofr(I,J,1) + xrofr(I,J+10,2) + xrosuh(I,k)
  1465.
                         + XRDFR(11.J+10.1) + XRDFR(1.J.2)
          95
                   CONTINUE
  1470.
          100
  1480.
                 CONTINUE
  149".
  15: C.
                 RETURN
  151 .
                 DEBUG SUBCHK
  152 ".
                 AT 1
  1530.
                 END
```

N 761 I BANK 85 DBANK

```
DIAMPUBLISH.RNDFRD
     04/19/82-11:50(0.1
21
          C+水本なの水水中水中中水中中水中中水中中水中中、 SUBROUTINE RNDFRD ********************
   100.
   110.
   120.
          €
   130.
          C
                 SUBROUTINE RNDFRD(XTMKLL,TOTYTG,XNPN,YNPN,PCXYYZ,PCYYXZ,
   140.
                                    XDFAT.XHDRW.XRDKLL.YSPFDG.XSPFDG.XRDFR1
   150.
                1
   160.
          C
                 THIS SUBROUTINE CALCULATES XRDFR(I.M.J), ROUNDS TO FIRE BY X
   170.
          C
                   FORCE WEAPON TYPES I IN TACTICAL MODE J=1.2 TO Y FORCE
   180.
          C
                   TARGET TYPES H OF WHICH H=11,20 ARE IN TACTICAL MODE 2
   190.
          C
   200.
          C
   210.
          C
                 XDFAT
                                  INDEX FOR X FORCE: 1=DEFENDING, 2=ATTACKING
                                  INDEX FOR X FORCE: 1=ENGAGING: 2=WITHDRAWING
   220.
          C
                 XWDRW
          C
                                  TIME TO KILL FOR X FORCE WEAPON TYPE I
   230.
                 XTHKLL(I.M.J)
                                  IN TACTICAL MODE J=1.2 AGAINST TARGET
   240.
          C
   250.
          C
                                  TYPE M OF WHICH M=11,20 ARE IN TACTICAL
          C
                                  MODE 2
   260.
                                  TOTAL NUMBER OF Y FORCE TARGETS FOR
          C
   270.
                 TOTYTG(1.J)
                                  X FORCE HEAPON TYPE I IN TACTICAL
          C
   280.
          C
   290.
                                  MODE 2
          C
                                  NUMBER OF X FORCE WEAPON TYPE K IN
   300.
                 II+L.IIN9HK
          C
   310.
                                  TACTICAL MODE L=1,2
                                  NUMBER OF Y FORCE WEAPON TYPE K IN
   32 D =
          C
                 ARBNIK T411
                                  TACTICAL HODE L=1.2
          C
   330 ..
   340.
          C
                                  PERCENT VISIBLE OF Y FORCE WEAPON
                 PCYVXHIK, N.L.I
          C
                                  TYPE K IN TACTICAL MODE L=1.2 TO X
   350.
   36 D.
          C
                                  FORCE HEAPON TYPE N OF WHICH N=11.20
   370.
          C
                                  ARE IN TACTICAL MODE 2
                                  PERCENT VISIBLE OF X FORCE WEAPON
   380.
          C
                 PCX4AR(I'W'T)
   390.
          C
                                  TYPE I IN TACTICAL HODE J=1.2 TO
                                  Y FORCE WEAPON TYPE M OF WHICH M=11,20
   400.
          C
   410.
          C
                                  ARE IN TACTICAL MODE 2
          C
                                  ROUNDS TO KILL FOR X FORCE WEAPON
   420.
                 XRDKLL(I,M.J)
   430.
          C
                                  TYPE I IN TACTICAL MODE J=1.2
                                  AGAINST Y FORCE TARGET TYPES M
          C
   440.
   450.
          C
                                  OF WHICH M=11.20 ARE IN TACTICAL
                                  MODE 2
   46 C .
          C
          C
                                  FIRE SUPPRESSION AGAINST X FORCE
   470.
                 XSPFDG(I.J)
                                  WEAPON TYPE I IN TACTICAL HODE J=1.2
   480.
          C
   490.
                                  FIRE SUPPRESSION AGAINST Y FORCE
          C
                 VSPFDG(K,L)
   500.
          C
                                  WEAPON TYPE K IN TACTICAL MODE L=1.2
   510.
          C
                 FRCTN
                                  FRACTION INDICATING TRUE FIRINGS
   520.
          C
   530.
          C
   540.
                            XTMKLL(10a20a2)aTOTYTG(10a2)aYWPN(10a3)aXWPN(10a3)
                 DIMENSION
   550.
                1 0
                             PCYVXZ(10,20,21, XRDFR(10,20,21, XRDKLL(10,20,2)
                             XSPFD3 (10,21, PC X VY Z (10, 20, 21, YSPFD6 (10, 2)
   560.
                2,
   570.
           C
   580.
   590.
                 FRCTN = 0.5
   600.
                 IF (XDFAT. EQ. 2) THEN
   610.
                   FRCTN = 0.25
   6200
                 END IF
                 IFEXHORW.EQ.21 THEN
   630.
   640.
                   FRCTN = 0.20
   650.
                 END IF
   66D.
   670.
           100
                 00 10 J=1,2
                                               3-70
   680.
                   DO 20 I=1.10
```

market for

```
69C.
                 DO 30 L=1.2
700.
                  DO 48 K=1,10
       C
710.
720.
                    xspbG = 1 - xspfbG11,J)
730.
                     YSPDG = 1 - YSPFDG(K,L) +0.33
                     RDKLL = XRDKLL(I,K+(L-1)+10.J)
740.
                     TMKLL = XTMKLL(I,K+(L-1)+10.J)
75 ° .
760.
                     TOTTE = TOTTIGII.JI
                     YHPNN = YHPN(K.L+1) + PCYVXZ6K.I+fJ-13+10.L1
771.
                    XWPNN = XWPN(1,J+1) + PCXYYZ(1,K+(L-1)+10,J)
780.
791.
       C
                     IFITOTTG.NE.O .AND. THKLL.NE.D) THEN
800.
                       810.
                     ELSE
820.
                       RDFR = 0
831.
                     END IF
841.
                     XRDFR(1,K+(L-1)*10,J) = RDFR * FRCTN
85 .
       C
86 C.
87 .
       40
                   CONTINUE
88 🐪
                 CONTINUE
       30
89 .
               CONTINUE
       20
91.0.
       10
             CONTINUE
911.
92 C.
             RETURN
931.
             DEBUG SUBCHK
941.
             AT 1CO
951 .
             LND
```

, ja

SIFIED

#### SIFIED

```
DIAMPUBLISH .RNDKLL
     04/01/82-10:3310,3
          R1
   100.
  110.
  120.
          C
          C
   130.
                SUBROUTINE RNDKLLIXYPKW, XRDKLL)
   140.
          C
                THIS SUBROUTINE CALCULATES ARDKLL 11. M. JI. ROUNDS TO KILL
   150.
   160.
          C
                  FOR X FORCE WEAPON TYPE I IN TACTICAL HODE J=1.2
                   AGAINST Y FORCE TARGET TYPES H OF WHICH H=11,20
          C
   170.
   180.
          C
                   ARE IN TACTICAL HODE 2
          C
   190.
                                 PROBABILITY OF KILL ISSPKI FOR X FORCE
          C
   200.
                 IL. M. II HAGYK
                                  WEAPON TYPES I IN TACTICAL MODE J=1+2
          C
   210.
           C
   520.
                                  AGAINST & FORCE TARGET TYPE H OF
           C
                                  HHICH H=11,20 ARE IN TACTICAL HODE 2
   230.
           €.
   240.
           C
    250.
    26 %
           C
                 DIMENSION XYPKW(10,2C,2), XRDKLL(10,20,2)
    270.
           C
    285.
           C
    29 d.
                 DO 10 J=1.2
           100
    300.
                   DO 20 I=1.10
    31 1).
                      00 30 L=1.2
    320.
                        DO 40 H=1,10
    330.
           C
    34 C.
                          PK=XYPKH11.K+(L-11+10.J)
    351.
                          IF IPK. GT. UI THEN
    36 C.
                            RDKLL = 1 / PK
    370.
                          ELSE
    380.
                            ROKLL : C
    3984
                          END IF
    480.
                          XRDKLL(1,K+1L-15+10,J) = RDKLL
    41 %
     420.
            C
                        CONTINUE
            40
     43 Ca
                      CONTINUE
            30
     44 0.
                    CONTINUE
            20
     45 Ca
                  CONTINUE
            10
     46 10.
            C
     470.
                  RETURN
     480.
                  DEBUG SUBCHK
     490.
                  A1 100
     510.
                  END
     51 C.
```

N 106 TBANK 3E DBANK

#### SIFIED

```
DIAMPUBLISH .RNGBNE
₹1
     04/G1/F2-19:33(G.)
          C:**************
   100.
                                     SCEROUTINE RNGBND
                                                         ***********
   110.
   1. ..
          €
   13.
          €
   14'.
                SUEROUTINE RMGB ND (DBLRNP, BRRGBD)
   15.
          C
   16 %
          C
                THIS SUBROUTINE CALCULATES BRRGEDII, J. N. 1, THE RANGE BANDS FOR
   17C.
          C
                  EACH BLUE FORCE WEAPON TYPE 1 IN TACTICAL MODE K=1.2 TO EACH REL
   IFG.
          C
                  FORCE LEAPON TYPE J OF WHICH J=11,20 ARE IN TACTICAL MODE 2
   15%
          C
   26G.
          C
                DSWREP(I.J.K)
                                 DISTANCE FROM BLUE FORCE WEAPON TYPE I IN TACTICAL
   210.
          €
                                 MODE K=1,2 TO RED FORCE HEAPON TYPE J OF WHICH
   .20.
          €
                                 J=11,20 ARE IN TACTICAL MODE 2
   23 .
          •
   26.
          C
   25 .
                DIMENSION DEWRWP410,20,21,888680410,20,21
   2£8.
          €
   23. .
          C
   781.
          1
                DO 10 K=1.2
   290.
                  00 20 1=1,10
   300%
                    00 30 J=1,20
   is .
          €
   32 .
                      ABSDST = ABSEDSWRWPEI,J.K11
   33' .
          •
   346.
                      IF (ABSOST.GT.4000) THEN
   35 E.
                         IBAND=6
   366.
                      ELSE IFFAESDST.GE.G .AND. ABSDST.LE.2001 THEN
   37 .
                         TRANDIT
   38C.
                      ELSE IFIABSDST.GT.200 .AND. ABSDST.LE.4001 THEN
   35C.
                         IBAND=2
   4GC.
                      ELSE IF (ABSDST.GT.400 .AND. ABSDST.LE.600) THEN
   41 .
                         IPAND=3
   42 C.
                      ELSE IFIABSDST.GT.600 .AND. ABSDST.LE.8001 THEN
   430.
                         IBAND=4
   44 .
                      ELSE
   45 .
                         IBAND=5
   46C.
                      END IF
   47".
          €
   451.
                      BRECEDII.J.KI = IBAND
   45 .
          C
   510.
          30
                    CONTINUE
  516.
          20
                  CONTINUE
  52 .
         10
                CONTINUE
   53 .
          (
   54".
                KITURN
  55 ".
                DEBUG SUBCHA
  5er.
                AT 1
  57 .
                LID
```

N 127 IBANK 38 DBANK

```
DIAMPUBLISH .RNG DS Y
   04/01/02-10:33(0.1
 100.
        C 文学本本学本学中 本在在在本文本本文在在本 SUBROUTINE RNGEST 在在本本本本本本本本本本本本本本本本本本本本本
 110.
         C
 12.
         C
 137.
         C
 140.
               SUBROUTINE RNGDST (BRRGBD , RBRGBD , DBWRWP , DRWBWP )
 150.
         C
               THIS SUBROUTINE DETERMINES RED FORCE WEAPON TO BLUE FORCE
 160.
        C
 176.
         C
                 WEAPON DISTANCES AND RANGES GIVEN THE DISTANCES AND
 180.
         C
                 RANGES FROM BLUE FORCE WEAPONS TO RED FORCE WEAPONS
 190.
         C
 200.
         C
               BRRGBD(I.M.J)
                                 RANGE BANDS FROM BLUE FORCE WEAPON TYPE I IN
 2104
         £
                                 TACTICAL MODE J=1.2 TO RED FORCE WEAPON TYPE M
 220.
        C
                                 OF WHICH H=11,20 ARE IN TACTICAL HODE 2
 230.
         C
               RERGBDIK . N . L ]
                                 RANGE BANDS FROM RED FORCE WEAPON TYPE K IN
 240.
         C
                                 TACTICAL MODE L=1,2 TO BLUE FORCE WEAPON TYPE
 250.
        C
                                 N OF WHICH N=11,20 ARE IN TACTICAL MODE 2
 26 ℃.
        C
               DBWRWP(I.M.J)
                                 DISTANCE FROM BLUE FORCE WEAPON TYPE I IN
 270.
         C
                                 TACTICAL MODE J=1.2 TO RE) FORCE WEAPON TYPE
 28C.
         C
                                 H OF WHICH ME11,20 ARE IN TACTICAL MODE 2
 290.
         ε
               DREBHP(K: A.L.)
                                 DISTANCE FROM RED FORCE WEAPON TYPE K IN
 300.
        C
                                 TACTICAL HODE H=1.2 TO BLUE FORCE WEAPON TYPE
 31 0.
        €
                                 N OF WHICH N=11,20 ARE IN TACTICAL MODE 2
 320.
        C
 33 6.
         C
 34 %
               DIMENSION
                           BRRGBD (10, 20, 2), RBRGBD (10, 20, 2),
 350.
                           DBWRWP(10,20,21,DRWBWP(10,20,21
        C
 36 G.
 370.
         C
 380.
               00 10 J=1,2
        1
 390.
                 DO 2C I=1,10
 400.
                    DO 30 L=1.2
 410.
                      DO 40 F=1,10
 42 P.
        C
 430.
                        RBRGBD | K, 1 4 | J - 1 | # 1 0 , L 1 = BRRGBD | 1 , K + (L - 1 ) # 1 0 , J 1
 440.
                        DRWBWP(K, I> (J-1) +1 C, L1 = DBWRwP(I, K+(L-)) +1 C, J)
 450.
         C
 46 D.
        40
                      CONTINUE
 47 C.
        30
                   CONTINUE
                 CONTINUE
 48 %
        20
 4900
        10
               CONTINUE
 5CO.
        C
 51 0.
               RETURN
               DEBUG SUBCHK
 52 (%
 531%
               AY 1
 54 0.
               END
```

N 149 IBANK 51 DBANK

```
DIAMPUBLISH.SPDG
     04/01/82-10:33(0.)
RI
   100.
          C ****************
                                     SUBROUTINE SPDG ****************
   110.
          C
   129.
          r
   13%
          (
   14 .
                 SUBROUTINE SPDG (NWDRW, YWDRW, NDF AT, NCHR, ENCLSS, EYCLSS, NARTSP,
   15 14
                                  XMNLSS.XSPFDG.XSPMDG1
   16.
          C
                 THIS SUBROUTINE CALCULATES XSPFDG(I,M,J) AND XSPMDG(I,M,J),
   170.
          C
   180.
          C
                   FIRE AND MOVEMENT SUPPRESSION FACTORS FOR X FORCE WEAPON
   190.
          C,
                   TYPE I IN TACTICAL MODE J=1,2, FROM THE OPPOSING WEAPON
   200.
          C
                   FORCE TYPE M OF WHICH M=11,20 ARE IN TACTICAL MODE 2
   221.
          C
   23' .
          C
                 XWDRW
                                 INDEX FOR X FORCE: ENGAGING=1, WITHORAWING=2
          C
                 THORK
                                 INDEX FOR Y FORCE: ENGAGING=1, WITHDRAWING=2
   240.
   251.
          C
                 XDF AT
                                 INDEX FOR X FORCE: DEFENDING=1. ATTACKING=2
          C
   260.
                 XCHR4I,43
                                 WEAPON CATEGORY FOR X FORCE WEAPON TYPE:
          C
                                 DISHOUNTED=1, MORTARS=2, LIGHT=3, HEAVY=4
   270.
                                 THE EXPECTED COMMITTEE LOSSES FOR X FORCE
   28C.
          C
                 EXCLSS(I,M.J)
          C
   29 ...
                                 TARGET TYPES I IN TACTICAL MODE J=1,2 FROM
   3:0.
          C
                                 OPPOSING FORCE WEAPON TYPES M OF WHICH M=11,20
          C
   310.
                                 ARE IN TACTICAL MODE 2
   32 C •
          C
                 EYCLSSIK,N,L)
                                 THE EXPECTED COMMITTEE LOSSES FOR Y FORCE
   331 .
          C
                                 TARGET TYPES K IN TACTICAL MODE L=1,2 FROM
   34 1%
          C
                                 OPPOSING FORCE WEAPON TYPES N OF WHICH N=11,20
   350.
          C
                                 ARE IN TACTICAL MODE 2
   36C.
          C
                 XARISP(I,J)
                                 ARTILLERY LOSSES FOR SUPPRESSION FOR X FORCE
   371 .
          C
                                 WEAPON TYPE I IN TACTICAL MODE J=1,2
   360.
          C
                                 MINEFIELD LOSSES FOR X FORCE HEAPON TYPE I IN
                 XMNLSSI1,JI
   39r.
          C
                                 TACTICAL MODE J=1,2
   400.
          C
                                 TACTICAL HODE J=1.2
   410.
          C
   421 .
          C
   43C.
                 DIMENSION
                             *CHR 110, 51, EXCLSS 110, 20, 21, EYCLSS 110, 20, 21,
   44C.
                1
                             XSPFDG 410,21,XSPHDG 410,21,COEF410,21,
   450.
                1
                             XTOTCL (10, 21, XARTSP (10, 21, XTOTCF (10, 21,
   460.
                1
                             XMNLSS(10,2)
   471.
          C
   461.
          €
   491.
          C
                 INITIALIZE COEFFICIENTS BASED ON WEAPON CATEGORY
                   DO 1C 1=1.10
   500.
          1
   510.
                     IFIXCHRII, 41.EQ.41 THEN
   520.
                       COEF(1,1) = 1
   530.
                       COEF(1,2) = 1
   54C.
                     ELSE IFIXCHRII. 41.EQ.2) THEN
   55C.
                       COEF11,11 = 2.86
   566.
                       COEF(11.2) = 2.66
   57: .
                     ELSE
   5/0.
                       COEF(1,1) = 2.86
   59t.
                       COEF11,21 = 2.86
   ETD.
                     END IF
   61".
          10
                   CONTINUE
   62 .
          C
   63(.
          C
                 LERO OUT ARRAYS
   140.
                   VAR -D
                   CALL INITI IXTOTCF . VARI
   65r.
   66C.
                   CALL INITIIXTOTCL, VARI
   670.
          C
   68".
          C
                 TOTAL LOSSES INFLICTED BY X FORCE WEAPON TYPES
                 TOTAL LOSSES OF X FORCE WEAPON TYPES
   691.
          C
```

3-75

```
IFIED .
   700.
                   DO 40 1=1.10
   71 0.
                     DO 5) J=1.2
   72 F.
                       DO 60 K=1,10
   730.
                          DO 70 L=1.2
   740.
                            XTOTCF (1, J) = XTOTCF (1, J) + EYCLSS (K, I+(J-1)+10, L)
   750.
                            XTOTCL(1,J) = XTOTCL(1,J) + EXCLSS(1,K+(L-1)+10,J)
   76 D.
          70
                            CONTINUE
   770.
          60
                          CONTINUE
   780.
          50
                       CONTINUE
   791.
          40
                     CONTINUE
   800.
          C
   81 0.
          C
                 ADD IN ARTILLERY LOSSES FOR SUPPRESSION AND MINE LOSSES
   820.
                   01.1:108 00
   e30.
                     DO 90 J=1.2
   84 C.
                       XTOTCL(I,J) = XTOTCL(I,J) + XARTSP(I,J) + XMNLSS(I,J)
   850.
          90
   86 Po
          80
                   CONTINUE
   871.
          €
                 CALCULATE SUPPRESSION
   88 ( .
   890.
                   DO 100 1=1,10
   900.
                     DO 110 J=1.2
   910.
                       IFIXTOTCF (1, J1.GT.O) THEN
   92 r.
                         RATIO = XTOTCLII.JI / XTOTCCII.JI
   930.
                          IF (XDFA).EQ.11 THEN
   940.
                            IF (XWDRH.EQ.1 .AND. YWDRW.EU.1) THEN
  95€.
                              FSP = COEF11.J1 * 12.06 * RATIO * 1.541 / 100
   96 %
   975.
                              FSP = COEF11,J1 + 41.06 + RATIO + .141 / 100
   980.
                            END IF
   99' .
                         ELSE
 1000.
                            IF (XHDRW.EQ.) .AND. YHDRW.EQ. 1) THEN
 1010.
                              FSP = COEF41.J1 * 48. * RATIO**1.5 + 3.281 / 100
 1020.
                            ELSE
 1030.
                              FSP = COEF11,J1 + 12.5 + RATIO++1.5 + .51 / 100
 1040.
                           END IF
 1050.
                         END IF
 1060.
                         XSPFDG1 1.J1 = AHIN11.8.FSP1
 1080.
                         XSPHDG(I,J) = AHIN11.9,FSP1
 1090.
                       ELSE
 1100.
                         xspfdg(i,j) = 0
 1110.
                         g = (L, I ) DOM Q Z K
 112 0.
                       END IF
 1130.
          110
                      CONTINUE
          100
 1140.
                    CONT INUE
 115°.
          C
 116 %
                RETURN
 1170.
                DEBUG SUBCHK
 1180.
                 C FA
 1196.
                 END
```

N 493 IBANK 185 DBANK

```
DIAMPUBLISH. TACUSM
- R1
      04/01/82-10:33(0,)
           100.
    110.
         . C
    120.
           C
    170.
           C
    141.
                 SUBROUTINE TACD SM4XDMV.XCHR.YCHR.XWPN.DXFXWP.DXWYWP.XTACA)
    150.
           C
           C
   167.
                 THIS SUBROUTINE ALTERS THE TACTICAL MODE OF ONLY LIGHT
   170.
           C
                   CATEGORY WEAPON TYPES IN THE ATTACKING FORCE.
    18C.
           C
                   A SPECIFIED OPPOSING WEAPON CATEGORY IS WITHIN A
           C
    190.
                   SPECIFIED DISTANCE, THE LIGHT CATEGORY CAN DISHOUNT
    200.
           C
                   INFANTRY.
    211.
           C
    12 %
           (
    230%
           C
                 ADMA
                                 INDEX FOR X FORCE: 1=HOUNTED, 2=DISMOUNTED
           C
   240.
                                 CATEGORY OF X FORCE WEAPON TYPE I:
                 XCHR41,41
    250.
           C
                                 1=DISHOUNTED, 2=MORTARS, 3=LIGHT, 4=HEAVY
   260.
           C
                                 CATEGORY OF Y FORCE WEAPON TYPE K:
                 YCHR(K,4)
   270.
           C
                                 1=DISHOUNTED, 2=MORTARS, 3=LIGHT, 4=HEAVY
    280.
           C
                                 NUMBER OF X FORCE VEAPON TYPE 1 IN TACTICAL
                 IL . L . NAMK
    29 %
           C
                                 MODE J=1.2
    300.
                                 DISTANCE FROM X FORCE WEAPON TYPE I IN TACTICAL
           C
                 IL, M, I ) 44YWKG
    311.
           C
                                 MODE J=1,2 TO Y FORCE WEAPON TYPE H OF WHICH
    320.
           C
                                 M=11,20 ARE IN TACTICAL MODE 2
    330.
           C
                                 TACTICS ARRAY FOR ATTACKING FORCE X
                 XTACALA,B)
    34'.
           C
                                 A=1 FOR LIGHT CATEGORY
    35 %
           C
                                 A=2 FOR HEAVY CATEGORY
           C
    36C.
                                 B=1 OPPOSING WEAPON CATEGORY
    370.
                                 B=2 DISTANCE BETWEEN A AND B=1
           (
    38 .
           C
                                 B=3 PERCENTAGE OF NUMBER OF WEAPON TYPES
    39 .
           C
                                 IN TACTICAL MODE 1 THAT GO INTO TACTICAL HODE 2
    400.
           C
                 DXFXWP4I,J1
                                 DISTANCE FROM X FORCE CENTROID TO X FORCE
    410.
           C
                                 WEAPON TYPE I IN TACTICAL MODE J=1.2
    42 .
           C
    43 . .
           C
    44 %
                             XCHR (10,5), YCHR (10,5), XWPN (10,3), DXWYWP (10,20,2)
                 DIMENSION
    450.
                1.
                             XTACA42,31,DXFXWP(10,2)
    4 f C .
           C
    47.
           C
    490.
           1
                 00 11 1=1,10
    45C.
                   DO 20 K=1.10
                      UO 30 L=1.2
    500.
    51'.
           C
    52 ".
                        XCAT=XCHR(1,4)
    53C.
                        IFIXCAT.EQ. 3) THEN
    540.
                          IF *XTACA (1, 1).EQ. YCHR (K, 4)) THEN
    55 U.
                            IF (XT ACA (1, 2). GE.ABS (DXWYWP (I, K+ (L-I)+10, 1))) THEN
    5€ .
                              DIST = DXFXWP41.11
    57. .
           C
    58 %
                              DISMOUNT TROOPS
           C
    59 %.
                                DO 40 M=1.10
    ero.
                                  IF (XCHR4M, 4).EQ.13 THEN
    611.
                                     IF (XWPN(M, 2).GT.O) THEN
    62 C.
                                       XWPN(H.3) = XWPN(H.2)
    €3".
                                       XWPNIM: 21 = 0
    640.
                                       DXFXWP(M.2) = DIST
    65 C.
                                       DXFXWP(M, 1) = -99999999
    66 .
                                     END IF
    67".
                                  END IF
           40
    680.
                                CONTINUE
```

```
SIFIED
   690.
           C
   700.
           C
                                CHANGE TROOP CARRIER HODE
   710.
                                   DO 50 N=1,10
   720.
                                     IF (XCHR(N: 4).EQ.3) THEN
   73 n.
                                       IF (XWPN(N,3).GE.D) THEN
   748.
                                         IF (XHPN(N, 2).GT.D) THEN
   750.
                                            XUPNINg 31 = XUPNIN, 21
   76 0.
                                            XWPNIN, 21 = 0
   778.
                                            DXFXWP(N.2) = DXFXWP(N.1)
   780.
                                            DXFXHP(N.11) = -4999999
   790.
                                        END IF
   em.
                                       END IF
   81 %
                                     END IF
   82 0.
           50
                                  CONTINUE
   830.
                                   XDMV = 2
   840.
                                  RETURN
   85 ":
           C
   860.
                              END IF
   870.
                           END IF
   88 0.
                         END IF
   850.
           C
   900.
           30
                       CONTINUE
   910.
           20
                     CONTINUE
   92 0.
           10
                  CONTINUE
   936.
           C
   94 %
           C
           C
   95 0.
   96 0.
                  RETURN
   97 U.
                  DEBUG
                          SUBCHK
   980.
                  AT I
   99 11.
                  END
```

N 340 IBANK 77 DBANK

```
DIAMPUBLISH . TACOVW
   04/01/82-10:33(0.)
 100.
        C 六水中中水水中水水中中水水中 SUBROUTINE TACOVE 大水水水水水油水水水水水水水水水水水水水水水水水水水
 11 0.
 12".
        C
170.
        C
 145.
              SUBROUTINE TACOVERXOVETH, XCHR, YCHR, XNPN, DXFXWP, DXWYWP, XTACA;
15Ç.
        C
        C
 16 C.
              THIS SUBROUTINE ALTERS THE TACTICAL MODE OF ONLY HEAVY
 17C.
        C
                CATEGORY WEAPON TYPES IN THE ATTACKING FORCE. WHEN
 180.
        C
                 A SPECIFIED OPPOSING WEAPON CATEGORY IS WITHIN A
 190.
        C
                 SPECIFIED DISTANCE, THE HEAVY CATEGORY CAN GO INTO
 200.
        C
                 OVERWATCH.
 010.
        C
 120.
        C
23 .
        C
              HTWVOX
                               INDEX FOR X FORCE: I=NOT IN OVERWATCH.
 240.
        Ç
                               2=IN OVERWATCH
                               CATEGORY OF X FORCE WEAPON TYPE I:
 25 C.
        C
              XCHRII,41
 261.
        C
                               1=DISHOUNTED, 2=HORTARS, 3=LIGHT, 4=HEAVY
        C
 270.
                               CATEGORY OF Y FORCE WEAPON TYPE K:
              YCHRIK,41
 .097
        C
                               !=DISHOUNTED, 2=MORTARS, 3=LIGHT, 4=HEAVY
 290.
        C
                               NUMBER OF X FORCE WEAPON TYPE I IN TACTICAL
              II+L, IIN9WK
 300.
        C
                               MODE J=1.2
 310.
        C
                               DISTANCE FROM X FORCE WEAPON TYPE I IN TACTICAL
               IL. H. I JAWYWKU
 120.
        C
                               MODE J=1,2 TO Y FORCE WEAPON TYPE M OF WHICH
 33 .
        C
                               M=11.20 ARE IN TACTICAL MODE 2
 340.
              XTACATA,B3
        C.
                               TACTICS ARRAY FOR ATTACKING FORCE X
 35 .
        C
                               A=1 FOR LIGHT CATEGORY
 3E .
        C
                               A=2 FOR HEAVY CATEGORY
 370.
        C
                               2=1 OPPOSING WEAPON CATEGORY
 '80°
        C
                               B=2 DISTANCE BETWEEN A AND B=1
 39 .
        C
                               B#3 PERCENTAGE OF NUMBER OF WEAPON TYPES
 960.
        C
                               IN TACTICAL HODE I THAT GO INTO TACTICAL MODE 2
 410.
        C
                               DISTANCE FROM X FORCE CENTROID TO X FORCE
              UXFXWP(I,J)
 42 %.
        C
                               HEAPON TYPE I IN TACTICAL HODE J=1,2
 43:.
        C
 44 1, .
        C
 45 ~.
              DIMENSION XCHR (10,5), YCHR (10,5), XWPN (10,3), DXWYWP (10,20,2)
 460.
                          xTACA(2,3),DXFXWP(10,2)
             1.
        C
 47C.
 480.
        C
 490.
        1
               Do 10 J=1.10
 500.
                 DO 20 K=1,10
 51'.
                   DO 30 L=1.2
 52 r.
        C
 53 r.
                     XCAT=XCHR (1,4)
 540.
                     IFIXCAT.EQ.41 THEN
 550.
                       IF(XTACA(2, 1).EQ.YCHR(K, 4)) THEN
 560.
                          IF (XTACA(2,2).GE.ABS(DXWYWP(I,K+(L-1)+10,1))) THEN
 57%
                            DIST = DXFXWP(I.1)
 58 .
        C
 59%
        C
                            SHIFT HEAVY WEAPONS INTO OVERWATCH
                              00 40 H=1.10
 6C D.
                                IF (XCHR(M, 4).EQ.4) THEN
 610.
 620.
                                  IF (XWPNIM, 2).GT.O) THEN
 630.
                                    xwPN4M_31 = xwPN4M_121 + xTACA42_31
 140.
                                    xwPn(M_12) = xwPn(M_12) - xwPn(M_3)
 651.
                                    DXFXWP(H.2) = DIST
 f60.
                                  END IF
 67 . .
                                END IF
 681.
        40
                              CONTINUE
```

3-79

```
SIFIED
                                  X CHUTH = 2
   690.
                                  RETURN
   700.
   71 0.
   72 11.
                              END IF
                           END IF .
   73 Ú.
                         END IF
   740.
   758.
           C
                       CONTINUE
   76 0.
           30
                     CONTINUE
   770.
           20
           10
                  CONTINUE
   780.
   790.
           C
   800.
           C
   81 %.
                  RETURN
   82 D.
                  DEBUG SUBCHK
    8304
                  AT 1
   840.
                  END
```

N 256 IBANK 73 DBANK

```
DIAMPUBLISH . TALLY
RI
     04/01/82-18:33 (0.)
   100.
          SUBROUTINE TALLY ***************
   110.
   120.
          C
   13 ..
          C
   140.
                SUBROUTINE TALLY IXWPN SEMILSS, MARTLS, MMNLSS, MDE 401
   150.
          C
   160.
          C
                THIS SUBROUTINE CUMULATES MDEAD(I.J). TOTAL LOSSES OF
   17G.
          C
                  X FORCE WEAPON TYPE I IN TACTUICAL MODE J=1.2. THE
          C
   180.
                  REMAINING & FORCE WEAPON TYPES ARE ALSO DETERMINED.
   1900
          ſ
   290.
          C
                XWPN(I.J+11
                              NUMBER OF X FORCE TYPE WEAPON TYPE I IN
   210.
          C
                              TACTICAL HODE J=1,2
                              TOTAL EXPECTED LOSSES FOR X FORCE HEAPON
          C
   220.
                EXTLSS[1.J]
   23".
          C
                              TYPE I IN TACTICAL MODE J=1.2
   2 £ C.
          C
                              MINE LOSSES FOR X FORCE WEAPON TYPE I IN
                IL, IIZZJAMK
   270.
          C
                              TACTICAL HODE J=1.2
   200.
          C
   291.
          C
   300.
                310.
               1.
                           XMNL SS 110,21
   320.
          (
   33'.
          C.
   340.
                DO 10 J=1.2
          1
   35 € •
                  00 20 1=1.10
   300.
          C
   370.
                    (Lyl)szanmk - (Lyl)szatka - (1+Lel)nquk = (1+Lel)nquk
   3800
                    XDEAD(I,J) = XDEAD(1,J) = EXTLSS(I,J) + XMNLSS(I,J)
   390.
          C
   40C.
                    IFIXUPNII.J+11.GT.C) THEN
   410.
                      IFIXARTLS 11. J1. GT . NWPN(1. J+11) THEN
   420.
                        XARTESII,JY = XUPNII,J+11
   431.
                      END IF
   44 i .
                    END IF
   451.
          C
   AEL.
                    XWPN(1,J+1) = XUPN(1,J+1) - XARTES(1,J1
   470.
                    XDEAD(1.J) = XDEAD(1.J) . XARTLS(1.J)
   48'
          3
   491
          20
                  CONTINUE
   510.
          10
                CONTINUE
   51 ...
          (
   52 C.
                RETURN
   531.
                DEBUG SUBCHK
   541 .
                AT 1
   55 11.
                LND
```

N 318 IBANK 51 DBANK

680.

SIFIED \_

```
DIAMPUBLISH . TERIN
R1
     04/01/82-10:33(0.)
   300a
          C A水水水水水水水水水水水水水水水水水水水水水 SUBRCUTINE TERIN 水水水水水水水水水水水水水水水水水水水水水水水水
   110.
   12 na
   130.
          C
                 SUBROUTINE TERINGIBAT: KK 25: PCRVBE: PCRVBW: PCRWVB: PCBVRE: PCBVRW:
   140.
                                    PCBHAR OF CHC OVARD IN B HOLH BHOTH OGN VIII
   150.
   160.
          C
   170.
          C
                 THIS SUBROUTINE LOADS THE FOLLOWING VISIBILITY TABLES,
   180.
                   CORRIDOR WIDTHS: WEAPON CATEOGORY DISTANCE OFFSETS:
          C
   190.
          C
                   AND DISENGAGEMENT CRITERIA
   200.
           C
          C
                 IBAT
                                   POINTER TO GAMER SELECTED TERRAIN FILE
   21 Ga
          C
   220.
                 KK25
                                  POINTER FROM VISIBILITY FILE
          C
                                  FRACTION OF RED FORCE HEAPON CATEGORY I
   2.30 .
                 PCRYBEII.J.K1
   240 a
           C
                                   11=DISMOUNTED, 2=MORTARS, 3=LIGHT,
           €
                                   4=HEAVY: VISIBLE TO BLUE FORCE WEAPON
   250.
   260.
           C
                                   CATEGORY J ISEE ABOVE I IN THE KTH RANGE
   270.
           €
                                   BAND 11=0-200, 2=200-400, 3=400-600,
   280.
          C
                                   4=600-800, 5=800-1000) DURING ENGAGEMENT
           C
                 PCBVREII, JOH)
                                   FRACTION OF BLUE FORCE WEAPON CATEGORY I
   290.
                                   VISIBLE TO RED FORCE WEAPON CATEGORY J
   300.
           C
   31 C.
           €
                                   IN THE KTH RANGE BAND DURING ENGAGEMENT
   320.
           C
                                   ISEE ABOVE !
   330.
           C
                 PCRABA11 27 41
                                   FRACTION OF RED FORCE WEAPON CATEGORY I
   3400
           C
                                   VISIBLE TO BLUE FORCE WEAPON CATEGORY J
   350.
           C
                                   IN THE ATH RANGE BAND DURING BLUE FORCE
   360a
           €
                                   HITHDRAWAL ISEE ABOVE 1
   376.
           C
                 PCBHUR61,J,KI
                                   FRACTION OF BLUE FORCE WEAPON CATEGORY I
           С
                                   VISIBLE TO RED FORCE BEAPON CATEGORY J
   381.
   390.
           C
                                   IN THE KTH RANGE BAND DURING BLUE FORCE
   400.
           C
                                   WITHDRAWAL
                                               ISEE ABOVE)
           €
                                   FRACTION OF RED FORCE WEAPON CATEGORY I
   910.
                 PCRHVB6 I.J.KI
                                   VISIBLE TO BLUE FORCE WEAPON CATEGORY J
   420.
           C
                                   IN THE KIH RANGE BAND DURING RED FORCE
   43 fl.
           C
           C
                                   WITHDRAWAL ISEE ABOVE !
   440a
           €
                                   FRACTION OF BLUE FORCE WEAPON CATEGORY I
   450e
                 PCBVRH41,Jaki
           €
                                   VISIBLE TO RED FORCE WEAPON CATEGORY J
   5600
           C
   470.
                                   IN THE KTH RANGE BAND DURING RED FORCE
   4810
           C
                                   WITHCRAWAL (SEE ABOVE)
   490.
           C
                 DGHATTEA . B I
                                   DISENGAGEMENT ATTRITION FRACTIONS OF
   500.
           C
                                   WEAPON CATEGORY A (I=DISMOUNTED.
   510.
           C
                                   2=MORTARS, 3=LIGHT, 4=HEAVYI AND
   52 E .
           C
                                   FORCE B (1=BLUE, 2=RED)
           C
   530.
                                   DISTANCE FROM B FORCE CENTROID TO WEAFON
                 DECHCIA, BI
   590.
           C
                                   HEAPON CATEGORY CENTROID A ISEL ABOVE)
   551 .
           C
                                   ABOVEI
           C
   560.
                                   CORRIDOR HIDTHS FOR ATTACKER NEAFON
                 AED TH (A, K)
           C
   570.
                                   CAYEGORY A IN RANGE BAND K ISEE ABOVE !
           C
   580.
                                   CORRIDOR WIDTHS FOR WITHDRAWING BLHE
                 BUDTH (A.K.)
   59 P.
           ¢
                                   WEAPON CATEGORY A IN RANGE BAND K
           C
   6000
                                   ISEE ABOVE 1
           C
   61 U.
                 RHO THIA ON 3
                                   CORRIDOR WIDTHS FOR WITHDRAWING RED
           €
   620.
                                   WEAPON CATEGORY A IN RANGE BAND K
           C
   630.
                                   (SEE ABOVE)
   641.0
           C
   6514
   66 D.
                 DIMENSION
                             PCRVBE 44 45 8 8 PCRVB & 44 4 5 1 8 PCR W B 4 4 4 4 5 1 8
   670°
                             PCB V FE & 4,4,51, PCB V R & 4,94,51, PCB W R & 4,4,51,
```

3-82

AND THE 4.53. BUDTHEA.53. RUDIHEA.53. DGMATTE4.21.

```
690.
                              DFCWC14,21
           \mathbf{c}
   700.
   711.
           C
   72 1.
           C
                  SET K25 BASED ON DESIRED FILE
   73 0.
                    DEFINE FILE 251220,20, U, K251
   74C.
            1
                    K25=35+(1BAT-11+1
   750.
           C
   76 C.
           C
                  READ RED VISIBLE TO BLUE DURING ENGAGEMENT
   770.
                    DO 10 K=1.5
   780.
                       READ 125 * K25 ) ( 1 PCR VBE 4 I , J, K ) , I = 1 , 4 ) , J = 1 , 4 )
   790.
            10
                    CONTINUE
   800.
           C
                  READ BLUE VISIBLE TO RED DURING ENGAGEMENT
   811.
           €
   820.
                    DO 20 K=1.5
   230.
                      READ 125 * K25 14 1 PCB VRE 4 I . J. K 1 . I = 1 . 4 1 . J=1 . 4 1
   841.
            20
                    CONTINUE
   85 r.
           C
   86'.
           €
                  READ RED VISIBLE TO BLUE WITHDRAWING
   87C.
                    DO 3D K=1.5
   .088
                       READ425*K25344PCRVBW4I,J,K3,J=1,43,J=1,43
   89r.
            31
                    CONTINUE
   900.
           C
                  READ BLUE WITHDRAWING VISIBLE TO RED
   91 1.
           C
                    DO 40 K=1.5
   92 C .
   930.
                      READ(25*K25)((PCBWWR(I,J,K),I=1,4),J=1,4)
   940.
            40
                    CONTINUE
   95 P.
           C
   96 U.
           C
                  HEAD RED WITHDRAWING VISIBLE TO BLUE
   97C.
                    DO 50 K=1.5
                       READ 125 * K25 1 1 4 PCRWVB 1 1 , J . K 3 , I = 1 , 4 1 , J = 1 , 4 1
   98C.
   95'.
           50
                    CONTINUE
 1 700.
           C
 1 010.
           C
                  READ BLUE VISIBLE TO RED WITHDRAWING
  102G.
                    DO 60 K=1.5
                       READ 125 "K25141PCBVRW41,J,K3,I=1,41,J=1,41
 1030.
           6 13
 104C.
                   CONTINUE
  1050.
           C
 1 06 C.
           C
                  READ OFFSET DISTANCES FOR BLUE THEN RED
  1070.
                    READ(25 * K25)( (DFC WC(I, J), I=1, 4), J=1, 2)
10"0.
           C
                  READ CORRIDOR WIDTHS FOR THE ATTACKER
  1090.
           C
  1100.
                    READ(25 * K25) ((AWDTH4I,J), J=1,5),I=1,4)
           C
  1110.
  112110
           C
                  READ BLUE WITHDRAWAL WIDTHS
  1130.
                    READ 425 * K2514 48 WD TH41, J1, J= 1, 51, I=1, 41
  1140.
           (
  115.
           C
                  READ RED WITHDRAWAL WIDTHS
                    READ(25 *K25) ((RNDTH(I,J),J=1,5),I=1,4)
  1160.
  1170.
           ί
  118 .
                  READ DISENGAGEMENT CRITERIA
           C
                    READ 125 'K25111DGHATT41, J1, I=1, 41, J=1, 21
  119 .
  1200.
           £
                  CEOSE 1251
  121(*
  1 72 .
                  KK25=K25
  1230.
                  RITURN
  1241.
           C
                  DEBUG SUBCHK
  1251.
           C
                  AT 1
                  LND
  1266.
```

N 153 IBANK 390 DEANK

CYFTEN

```
DIAMPUBLISH . TIMENG
   04/01/82-10:33/0.1
 100.
        11.0.
        C
 1200
        C
 130%
        C
               SUBROUTINE TIMENG (XOUNTH, X YPKH, XYRGBD, XCHR, YCHR, YDF AT.
 140.
 150e
                                  XDTCT aXTHENG)
 160.
        C
 170.
        C
               THIS SUBROUTINE CALCULATES, ATHENGII. N. JI. TIME TO ENGAGE
                 FOR X FORCE MEAPON TYPE I IN TACTICAL HODE J=1,2 TO ALL
 18 Ca
        C
        C
 190.
                 Y FORCE TARGET TYPE H OF WHICH H=11,20 ARE IN TACTICAL
        C
 200.
                 MODE 2
 21 0.
        C
        ε
 22 0.
               HTHYOK
                               INDEX FOR X FORCE: NOT IN OVERWATCH=1.
 230.
        €
                               IN OVERHATCH=2
 240.
        C
               ADTCTIA,B,C&
                               X FORCE DETECT TIMES BASED ON EXPOSURE
 25 C.
        €
                               A. SENSORS B. AND RANGE BAND C
        C
                               PROBABILITY OF KILL FOR X FORCE
 260.
               IL M. II BRAYK
                               REAPON TYPE I IN TACTICAL MODE J=1.2
        C
 270.
                               AGAINST Y FORCE TARGET TYPE H- OF WHICH
 280.
        C
        €
 290.
                               M=11,20 ARE IN TACTICAL MODE 2
        C
 300<sub>o</sub>
                               RANGE BANDS FOR & FORCE WEAPON TYPE I
               IL, 4, I DOSORYK
 31 0.
        C
                                IN TACTICAL MODE J=1.2 AGAINST Y FORCE
                                TARGET TYPE M OF WHICH M=11.20 ARE IN
 32 Ca
        C
 330.
        C
                               PACTICAL MODE 2
 346.
        C
                               CONTAINS SENSOR TYPE FOR X FORCE
               XCHR4Io18
        C
 351
                               WEAPON TYPE I: EYE=1. OPTICAL=2
        C
 360.
                                THERMAL= 3, IMAGE INTENSIFIER = 4
 37 C.
        C
               VCHR6I248
                               CONTAINS CATEGORY OF Y FORCE WEAPON
 380.
        €
                               TYPE I: DISHOUNTED=1, MORTARS=2
 3900
        C
                               LIGHT=3. HEAVY=4
        C
 400.
               YDFAT
                               Y FORCE DEFEND OR ATTACK VARIABLE:
 910.
        C
                               DEFEND=1. ATTACK=2
        C
                               VEHICLE EXPOSED=1, VEHICLE IN DEFILADE=2
 42 C.
               IEMPSR A:
        C
 9300
                                SOLDIER EXPOSED=3, SOLDIER IN DEFILADE=4
 440.
        C
 45Ca
 4610
               DIMENSION XYPK+ (10, 20, 21, XYPGBD4 10, 20, 21, XCHR 410, 51
 47Ca
                          VCHR ( 10, 5 ) . NTMENG ( 10, 20, 21, XDTCT ( 4, 4, 5 )
 480.
        €
 49 Ca
        ſ
 500.
        100
               DO 10 J=1,2
 510.
                 00 20 1=1,10
 520.
                   DO 30 1=1,2
 53%
                     DO 40 #=1.10
 541.
        €
 55 F.
                        ICAY =YCHR&K,43
 560.
                        IF (XYPKW(I = K * (L - 18 × 10 , J ) . GT . O ) THEN .
 57 Ca
        C
 580.
                          IFIICAT EQ. 31 THEN
 59 .
                            IF I YOFAT . EQ . 21 THEN
 600.
                              IEXPSR=1
 611%
                            ELSE
 62 Ca
                              IEXPSR=2
 63°a
                            END IF
 64 Ca
        C
 65€.
                          ELSE IFILCAT. EQ. 43 THEN
 66 D.
                            IF LYDFA TOE 0.21 THEN
 671.
                              I IL.EQ. 21 THEN
 680.
                                IF 1 X O Y U T H . E Q . 21 THE N
```

3-84

```
SIFIED
   69C.
                                       JEXPSR=2
   700.
                                    ELSE
   710.
                                       IEXPSR=1
   72 .
                                    END IF
   73°.
                                  ELSE
   74' .
                                    IEXPSR=1
   75C.
                                  END IF
   76 .
                                ELSE
   77".
                                  IEXPSR=2
   780.
                                END IF
   79' .
           C
   80D.
                             ELSE IFIICAT.EQ. 11 THEN
   81 0.
                                IF (YDFAT.EQ. 2) THEN
   820.
                                  IFIL.EQ.21 THEN
   830.
                                    JEXPSR=3
   .748
                                  ELSE
   851.
                                    IEXPSR=4
   860.
                                  END IF
   879.
                                ELSE
   88 €.
                                  IEXPSR=4
   .788
                               END IF
   900.
           C
   910.
                             EL SE
   92%.
                               IE XPSR= 4
   93C.
           C
   941%
                             END IF
   950.
           Ç
   960.
                             XTMENG(1,K+(L-1) + 10,J) =
   97 ".
                 1
                               XDTCT(IEXPSR, XCHR(1, 11, XYRGBD(1, K+(L-1)+10, J))
   98 ".
           €
   99 .
                           E1 SE
  1000.
                             XTMENG(1,K+(L-1)+10,J) = 9999999
 1.10.
                           E+D IF
 1720.
           ¢
 1030.
                           IF (XTHENG(I,K+(L-1)*10, J1.LE.O) THEN
 1049.
                             XIMENG(1), K+(L-1)+10, J1 = 99999999
 1050.
                           END IF
 1 "60.
           C
 1170.
          4 6
                        CONTINUE
 1080.
          30
                      CONTINUE
 1090.
                    CONTINUE
          20
 11'0.
          10
                  CONTINUE
 1117.
           C
 112".
                  RETURN
 1138.
                  DEBUG SUBCHK
                  AT 100
 114r.
 115 H.
                  END
```

N 312 IBANK 75 DBANK

```
DIAMPUBLISH . THKLL
   04/01/82-10:33(0,)
                                    SUBROUTINE THELL
 100.
        C 公存收存款 专办办事业会会业会会 安全
                                                        **************
 310.
 120.
        C
 139.
        £
               SUBROUTINE THKLLIXTHENG , XCHR, XRDKLL , X YRGBD , XTMKLL )
 140.
        Ć
 150.
        C
               THIS SUBROUTINE CALCULATES, XTMKLL(I,M,J). THE TIME TO KILL
 16 %
        C
                 FOR X FORCE WEAPON TYPE I IN TACTICAL MODE J=1,2 AGAINST
 170.
                 Y FORCE TARGET TYPES M OF WHICH ME11.20 ARE IN TACTICAL
 180.
        C
        Ç
 1900.
                 MODE 2
 200.
        C
 210.
        C
               XYRGBD(I,M,J)
                                RANGE BANDS FROM X FORCE WEAPON TYPE I IN
 228.
        C
                                TACTICAL MODE J=1,2 TO Y FORCE TARGET TYPE
 230.
        C
                                M OF WHICH M=11,20 ARE IN TACTICAL MODE 2
        C
                                TIME TO ENGAGE FOR X FORCE WEAPON TYPE I IN
 240.
               XTHENG( I.M.J!
        C
 250.
                                TACTICAL HODE J=1.2 AGAINST Y FORCE TARGET
        C
 260.
                                TYPES H OF HHICH H=11,20 ARE TACTICAL HODE 2
 270.
        C
               XCHRII,21
                                CONTAINS FLIGHT TIME IN SECS/200 METER RANGE
        €
                                BANDS FOR X FORCE WEAPON TYPE I
 280.
        C
                                CONTAINS TIME TO AIM, FIRE, AND RELOAD FOR
 290.
               XCHRII.51
        C
 300.
                                X FORCE WEAPON TYPE I
 31 0.
        C
 32 G.
         C
 33 C.
               DIMENSION XTMENG (10, 20, 2), XCHR (10, 5), XRDKLL (10, 20, 2)
 340.
                           XYRGBD(10,20,2), XTHKLL(10,20,2)
              1.
 350.
        C
 360.
         C
 370.
               DO 10 J=1.2
 380.
                 DO 20 1=1.10
 390.
                    00 30 L=1.2
 400.
                      DO 40 K≈1.10
 41 ().
         C
 42 N.
                        IF IXYRGBD II , K+IL-11 #10 . J1 . EQ . c) THEN
 430.
                          XTMKLL{1,K+(L-1)=10,J} = 0
                        ELSE
 44 D.
 450.
                          XTMKLL(1, K \ (L - 1) \ 10, J ) = XTHENG(1, K \ (L - 1) \ 10, J)
 460.
              1
                             + (xCHR41,5) + xCHR(1,2) + xYRGBD(1,K+(L-1)+10,J))
              2
                               470.
 48 0.
 490.
                        XTHKLL (1, K 4 (L-1) * 10,J) = XTHKLL (1, K + (L-1) * 10,J) / 60.
 500.
        ε
 51 C.
        40
                      CONTINUE
 52 F.
        30
                    CONTINUE
 53 C.
        20
                 CONTINUE
 54 D.
        10
               CONTINUE
 55 C.
         C
 560.
               RETURN
 57 U.
               DEBUG SUBCHK
 586.
               AT 1
 59 ( .
               END
```

1 260 IBANK 62 DBANK

```
DIAMPUBLISH . UPNOST
    84 /81/ 82-13:33 (6,)
         [+++++++++++++++++++
 100.
                                     SUBROUTINE WPNDST
                                                         **********
 11 %
 120.
         C
 13:.
         €
 140.
               SUBRCUTINE WPNDST &DBFBWP DRFRWP DSTBR BWPN RWPN DBWRWP .
 150.
              1
                                  DSTHINE
 181.
         €
 175.
         C
               THIS SUBROUTINE CALCULATES DBWRWP(I,M,J,I, THE DISTANCE
 180.
         £
                 FROM BLUE FORCE HEAPON TYPE I IN TACTICAL MODE J=1.2 TO RED
. 190.
         C
                 FORCE REAPON TYPE M OF WHICH M=11,20 ARE IN TACTICAL
         C
 192.
                 MODE 2
         C
 268.
         C
 218.
                              DISTANCE FROM BLUE FORCE CENTROID TO BLUE FORCE
               DBFBEP(I,J)
 220.
         €
                              WEAPON TYPE I IN TACTICAL MODE J=1.2
 2 3C.
         C
               DRFRHP4K.L1
                              DISTANCE FROM RED FORCE CENTROID TO RED FORCE
         C
 245.
                              WEAPON TYPE K IN TACTICAL MODE L=1.2
 250.
         C
                              DISTANCE BETWEEN BLUE AND RED FORCE CENTROIDS
               DSTBR
 26C.
         C
                              NUMBER OF BLUE HEAPON TYPE I IN TACTICAL
               BUPNII.J:31
 270.
         C
                              MODE J=1.2
 280.
         C
                              NUMBER OF RED WEAPON TYPE K IN TACTICAL
               RWPN4K,L+11
         C
 296.
                              HODE L=1.2
 30C.
         C
                              MINIMUM DISTANCE BETHEEN OPPOSING WEAPONS
               DSTMIN
         €
 31 F.
 32€.
         C
 33:.
               DIMENSION DBFBWP410,21,DRFRWP410,21,BWPN410,31
 34C.
              1.
                           RWPN(10,31,08WRWP(10,20,2)
 350.
         C
 36C.
         1
               00 10 J=1,2
 37C.
                 00 20 I=1,10
 38G.
                   DO 30 L=1.2
 390.
                      80 40 K=1.10
 41 D.
         €
                        IF (BWPN(I,J+)).61.0 .AND. RWPN(K.L+1).67.0) THEN
 410.
                          DBWRWP4I, K+4L-11+10,J1 = DSTBR-DBFBWP4I,J1-DRFRWP4KaL1
 420.
 436.
                        EL SE
 44[.
                          DBWRWP{1,K+(L-)}*10,J) = -99999999
 451 .
                        END IF
 46.0
         £
 47'.
         40
                      CONTINUE
 48[.
         30
                   CONTINUE
 451.
         20
                 CONTINUE
 510.
         10
               CONTINUE
 51 . .
         C
               DETERMINE MINIMUM DISTANCE BETWEEN OPPOSING NEAPONS
 52 C.
         C
 530.
                 DSTHIN = ABSEDBURNPES, 1, 111
 540.
                 DO 50 1=1.10
 55 C.
                    DO 63 M=1,20
                      DO 70 J=1,2
 56 F.
 57C.
                        DSTHIN = AMINICOSTHIN, ABS(DBURUP(I, M, J))
         70
 580.
                      CONTINUE
 59: 0
         60
                    CONTINUE
 6: D.
         50
                 CONTINUE
 61 Ce
         €
 €2 €
               RETURN
 630.
               DEBUG SUBCHK
 £41.
               AT 1
 £58.
               END
```

## DISTRIBUTION

ORGANIZATION	NUMBER	0F	COPIES
Commander Combined Arms Center Fort Leavenworth, KS 66027			
Deputy Commander USACACDA ATZL-CAR Fort Leavenworth, KS 66027		1	
Commander USATRADOC ATCD-SA (Mr. Christman) Fort Monroe, VA 23651		1	
Commander USATRADOC ATCD-A Fort Monroe, VA 23651		1	
Commandant USAIS ATSH-CD-CSO-OR Fort Benning, GA 31905		1	
Director USATRASANA ATAA White Sands Missile Range, NM 88002		1	
TREM P.O. Box 8692 Naval Postgraduate School Monterey, CA 93940		1	
Commander Defense Technical Information Center Cameron Station Alexandria, VA 22314			